ARCHAEOLOGICAL INVESTIGATIONS AT CA-TEH-1783, THE JELLY MOUND SITE

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Acknowledgements

The completion of this project represents the efforts of many people. Excavation was accomplished by members of the Shasta College Field Archaeology class and other volunteers under the direction of Penni Carmosino. Those who participated include Joyce Abbott, Doug Ashford, John Brooks, Pat Carey, Jack Carey, Joey Carmosino, Ed Clewett, Kjersti Cochran, Carrie Engell, Chuck Engell, Victor Franchetti, Patti Heit, Gypsy Maxwell, Jeanette Maxwell, Scott McDonald, Vicki Philben, Philip Morris, Sean Morris, J. Morris, Kyle Morris, Elaine Sundahl, Jessie Tirri, Larry Wilkerson, and Doug Van Brandt. Vito and Amanda Carmosini also spent several days in the field, contributing their help and encouragement.

Ed Clewett provided a contour map of the site, which served as the basis for Figure 2. A photographic record of the excavation was accomplished by Pat and Jack Carey. Eric Ritter, Bureau of Land Management archaeologist who served as the contractor's representative, visited the site several times and produced the soil profile and other soil description. Ritter also provided the photo that appears on the cover of this report, and reviewed the draft of the report.

Jack Meyer kindly provided results of geoarchaeological studies conducted at the site and in the surrounding area. Grey White shared unpublished data on archaeological excavations in progress in the Turtle Creek area.

Auxiliary analyses key to interpreting the cultural materials from the site were conducted by the following: Thomas M. Origer, Director of the Sonoma State University Anthropological Studies Center performed obsidian hydration analyses; Darden G. Hood, Director of the Beta Analytic Inc. Radiocarbon Dating Services provided radiocarbon analyses; and James C. Chatters, Applied Paleoscience, analyzed the mussel shell.

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Introduction

Long before the first American fur trappers and miners explored along the Sacramento River in northern California, Native American Indians traveled its banks, leaving behind traces of their passing. Who were these early people? How did they meet their basic economic, social, and spiritual needs? Although some information has come down through time, told from generation to generation, far more has been lost with the passing of the centuries. The tangible remains which mark their activities, often recorded as archaeological sites, are the most promising means of learning more about the lives of these early peoples.

A large number of prehistoric sites once lay along the banks of the Sacramento. A few of these have been studied but many more have been destroyed without any record by the construction of roads, railroads and towns, and by mining and agricultural practices. Those that remain are potentially valuable in the pursuit of prehistory. One such site, the prehistoric cultural deposit recorded as Jelly Mound (CA-TEH-1783), is located on the Sacramento River about eight miles north of Red Bluff, California (Figure 1) on land administered by the Bureau of Land Management (BLM).

The Jelly Mound site was recorded in November 1997 by BLM personnel during a reconnaissance of BLM parcels (Barnes and Ritter 1998). Visible cultural materials, consisting of manos, metates, a hopper mortar, and obsidian and basalt debitage, were noted as being clustered into two loci. The overall dimensions were mapped as 115m north to south and 55m east to west. The site has served for some years as agricultural land, part of the Jelly Ranch, and at present lies within a fenced cow pasture. Because this parcel of land was scheduled for sale or exchange to agricultural interests, BLM needs to evaluate the site in terms of its National Register eligibility in order to design possible protections.

Native American consultation was conducted by BLM prior to the fieldwork with letters directed to the Pit River Tribe, the Redding Rancheria, and to Willard and Mildred Rhodes. No concerns were expressed about the potential land exchange or other impacts to the area.

The Shasta College Field Archaeology class, under the direction of Penni Carmosino, devoted the Spring semester of 2000 to testing the site. The primary goal was to provide archaeological data to BLM that could be used in determining the National Register significance of the site. Other goals of the field investigation included the education of students, interpretation of the cultural materials, and public outreach.

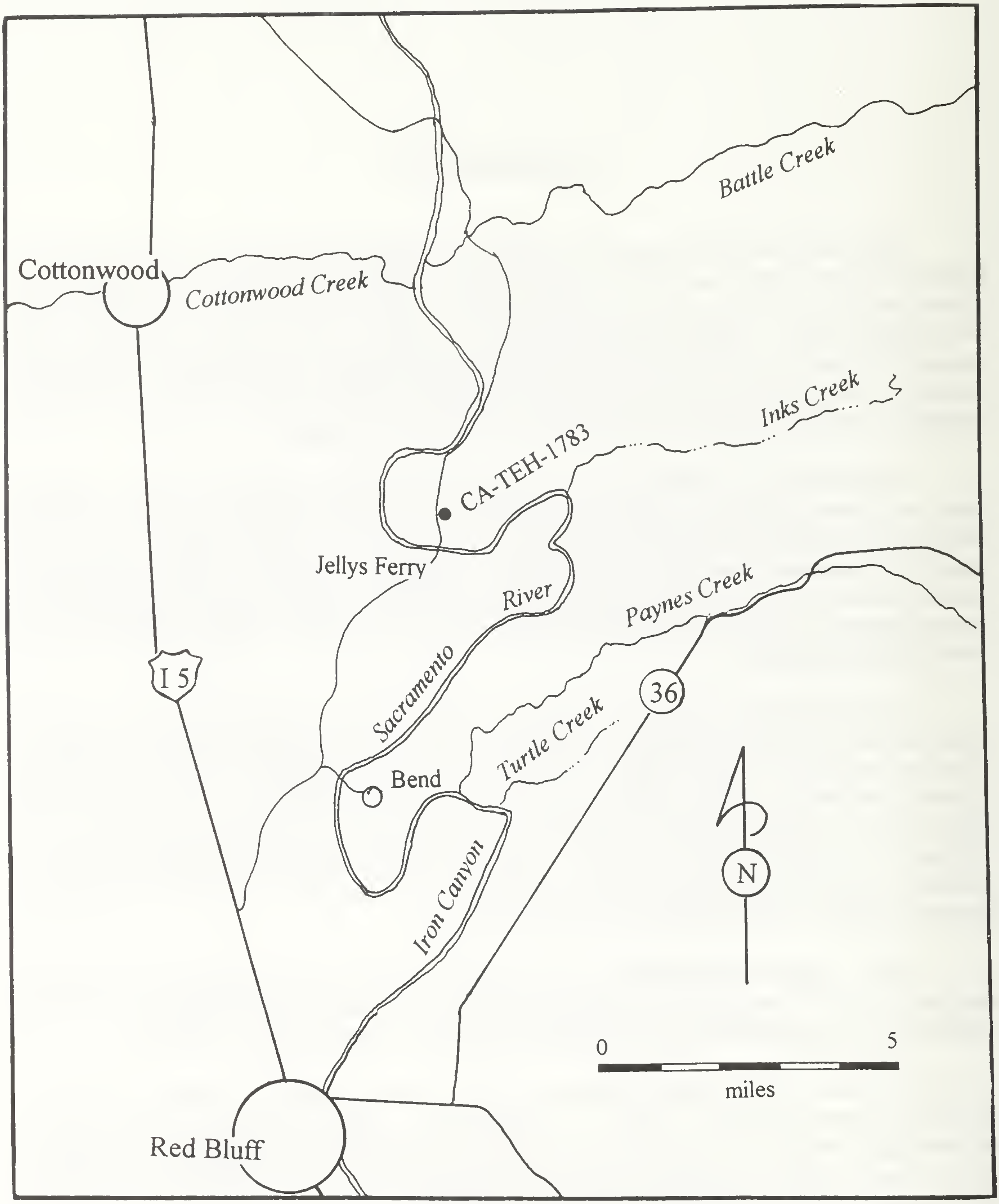


Figure 1. Location of CA-TEH-1783, the Jelly Mound Site.

Archaeological Background

The Sacramento River between Cottonwood and Red Bluff has created several large bends or loops, seemingly searching for the contact between the Pliocene-aged alluvial deposits on the west and the Pliocene and Pleistocene volcanic flows on the east. In places the river and its tributaries have cut through the volcanic tablelands, forming cliff-lined canyons, and in other places has carved broad channels which now feature terraces composed of Holocene alluvium. The terraces provide ample locations for prehistoric village and campsites while the basaltic cliffs feature numerous overhangs suitable for use as shelters. The plateau-like tops of the volcanic flows offer abundant space for small middens and lithic scatter sites.

BLM has extensive holdings along the Sacramento River from Battle Creek south to the vicinity of Red Bluff and has conducted or sponsored numerous archaeological investigations in the area (see Ritter and Crew n.d. for summary table). A number of sites have been recorded, and a few have been test excavated. The following provides a brief summary of previous work in the area.

Mixed strategy, project-related surveys conducted between 1977 and 1980 by BLM archaeologist Clark Brott recorded " . . a wealth of prehistoric cultural sites and materials" (Brott 1980). A number of middens and features were found near the Sacramento River and Paynes Creek, as well as a continuous lithic scatter more than a mile long on slopes away from the river. Some of these sites and artifacts were assigned to the proposed Archaeolithic Lassen Complex, a core-chopper-flake tool industry dating possibly as old as 12,000 to 20,000 years before present. A test excavation was later conducted at one such site, CA-TEH-1551, as it was scheduled to be developed into a parking lot. A subsequent analysis of the lithic materials resulted in the determination that the site served as a quarry/primary reduction workshop with evidence for the bipolar hammer and anvil technique (Crew 1984). A later study compared technological aspects of artifacts and debitage from CA-TEH-1551 to that from several other sites in the Redding area that appeared to have similar core-flake industries. While none of the sites could be specifically dated, it was concluded that most probably predate the latest prehistoric period and that they represent task-specific activities (Ritter and Crew 1988; n.d.).

A cultural resource survey was conducted by BLM on some of the lands in the Jellys Ferry area, largely on a series of Holocene river terraces. Results included six small midden sites including Jelly Mound, one rock shelter, one lithic scatter, and two petroglyph sites. One of the petroglyph sites contains complex elements and the other features panels of cupules. A boulder with cupules was also found in one of the midden sites (Barnes and Ritter 1998:18-20).

A systematic BLM survey of 2550 acres, predominantly along the river from Inks Creek to Paynes Creek, resulted in the recording of seven large midden sites, 14 small-to-medium sized habitation sites, 13 lithic scatters, three rock shelters, three rock rings or blinds, and one quarry (Ritter 1986). A boulder featuring a single cupule was later found in the same area bordering the River (Barnes and Ritter 1998:20).

During 1990 and 1991, field crews from the Department of Anthropology, California State University, Chico (CSU-Chico), conducted a survey in the central portion of the Paynes Creek Recreational Area between Inks Creek and Paynes Creek. An intensive survey of 260 acres produced eight newly recorded prehistoric sites—four rock shelters, three lithic scatters, and a quarry. The survey area was predominantly located away from the river's edge and the sites were found in an area one-half mile to one mile from the river. All sites were located within 200m of a seasonal or ephemeral water source, suggesting temporary or seasonal occupation. And since flaked stone outnumbered grinding tools, it was concluded that these sites represent a relatively small, mobile population with subsistence geared toward the procurement and processing of animal foods (Hamusek and Kowta 1991).

Archaeological reconnaissance by BLM of approximately 500 acres in the area east of Bend that lies between Paynes Creek and Turtle Creek has resulted in the recording of four lithic scatters (Kraft and Ritter 1999:13-14). Another seven sites have been recorded on Turtle Creek by CSU-Chico, including three rock shelter/lithic scatters, two rock shelter sites, a bedrock mortar, and one possible midden (Greg White, personal communication to Jarith Kraft, cited in Kraft and Ritter 1999:5-9).

Several surveys in the Iron Canyon/China Hill area east of Bend on the southwest side of the river, resulted in the recording of 42 prehistoric sites. Seventeen sites were found along the edge of the river during a BLM survey to assess flood damage. These included 12 rock shelters, two midden sites, two lithic scatters, and one petroglyph site (Barnes and Ritter 1998:21-24). Further survey by BLM and CSU-Chico of approximately 900 acres on the plateau encompassed by the loop of the river recorded 25 additional prehistoric sites. Eighteen were lithic scatters, six were occupational sites with middens and/or housepit depressions, and one was a rock shelter with midden (Hamusek 1996; Kraft and Ritter 1999:9-13).

The Shasta College Field Archaeology class, under an agreement with BLM, excavated three prehistoric sites in the Bend area between 1990 and 1992. Two were open middens and one was a rock shelter with a midden deposit. Cultural materials recovered from these sites were assigned to three chronological phases. The earliest, provisionally dated between 2500 and 1500 BP and characterized by large corner-notched and leaf-shaped points, was believed to represent sporadic encampments by people hunting mammals with atlatls. The second phase, dated 1500 to 800 BP, is represented archaeologically by small, notched points, manos, millingstones, hopper mortars, pestles, notched-pebble net weights, and large numbers of cores, cobble tools, and edge-modified flakes of metavolcanic material. The third phase, 800 to 300 BP, appears to be a continuation of the second phase with the addition of Gunther Series points. A house structure was also assigned to this phase. The latter two phases are believed to represent a seasonal/ riverine expression of an unnamed aspect of the Tehama Pattern, exemplifying only a portion of the annual subsistence round with other aspects found in foothill and mountainous terrain (Sundahl 1993).

Field archaeology classes from CSU-Chico, under the direction of Grey White, have been conducting excavation and site mapping at three sites in the Turtle Creek area for the past several years. One site, named the Sentinel Rockshelter, was found to have a 4m-deep midden deposit which produced a wealth of cultural remains and radiocarbon dates. Cultural materials were

divided into three strata. The upper 1.3m of depth was characterized by Gunther Series projectile points, triangular and small notched points, hopper slabs, manos, and considerable quantities of shell, and dated from 700 BP to 150 BP. Depths from 1.5m to 2.3m were assigned to the temporal period of 1650 BP to 1450 BP and were represented by larger Gunther points, pestles, and cupules. The lowest stratum, 3m to 4m in depth, was dated at greater than 2000 BP and produced large corner-notched points. A large number of obsidian hydration values, predominately on Tuscan obsidian, were also associated with these levels (Greg White, personal communication 2001).

Research Considerations

Research goals of the investigations described above have included testing of Pre-Wintu/Post-Wintu hypothetical models and ethno-linguistic boundaries (Hamusek and Kowta 1991); research in cultural chronology, cultural identity, and site function within a settlement pattern (Sundahl 1993); studies of culture history/chronology, settlement pattern/subsistence strategies, and lithic procurement strategies (Hamusek 1996); and site structure and landscape evolution studies (White 1999). The research objective of the current investigations was to determine whether the Jelly Mound site can contribute significant data to these areal research questions.

The Pre-Wintu/Post-Wintu models test the hypothesis that the ancestral Yana occupied the east bank of the Sacramento River prior to A.D. 500 but were replaced after that time by Wintu incursions (Hamusek and Kowta 1991:33-34). Questions of ethnic-linguistic boundaries and possible Wintu replacement of the Yana are pertinent since the project area lies near the common boundaries of three different ethno-linguistic groups: the Wintu to the northwest, the Nomlaki or Central Wintun to the southwest, and the Yana to the east. Actual cultural assignment of the project area during the late prehistoric era is uncertain. Powers (1976:230), Waterman (1918:40), and Kroeber (1976:351) all chart the area within the territory of the Nomlaki, while Merriam (1966, Map 5) awards it to the Wintu and Sapir and Spier (1943, Map 1) claim it for the Yana

The Wintu and Nomlaki are closely related linguistically and culturally, both members of the Wintuan language family of the Penutian linguistic stock. The Yana, by contrast, are members of the Hokan linguistic stock, thought to be far more ancient in northern California than the Penutian stock (Shipley 1978:82-86). Artifacts assigned to the Wintu are classed as the Shasta Complex or Redding Aspect of the Augustine Pattern. Dating within the past 1000-1200 years, the Shasta Complex is exemplified by Gunther series and Desert side-notched projectile points, large leaf-shaped obsidian blades, drills, pestles, hopper mortars, arrow shaft smoothers, clam disc beads, Olivella and Glycymeris beads, a number of abalone shell artifacts, and a series of bone tools including gorge fishhooks, harpoon points, awls, and needles. This artifact assemblage is believed to represent a life-style characterized by permanent habitation in riverine villages, and a heavy reliance on the exploitation and storage of salmon and acorns (Treganza 1954, Sundahl 1982).

Prehistoric complexes thought to represent the Yana are termed the Mill Creek and Dye Creek Complexes and include Gunther series and Southern Cascade notched point styles, hopper mortars, pestles, manos, and millingstones. The Mill Creek complex is distinguished by the addition of Desert side-notched points (Baumhoff 1957:28-32; Johnson 1984). A Sacramento River variant of these complexes, identified in the Bend area and titled the Bend Complex, contains in addition a large number of metavolcanic and basalt cores, core tools, hammerstones, edge-modified flakes, and notched-pebble net weights. The life-style practiced by the Yana is believed to have been more transhumant than that of the Wintu, with family groups changing residence during much of the year to follow available resources (Sundahl 1993:160-161; also see Wiant 1981; Johnson 1984:47-48).

As it has been proposed that the Yana and Wintu had separate subsistence and settlement strategies, archaeological components dating after A.D. 500 should provide evidence by which this hypothesis can be tested (Hamusek and Kowta 1991:33-34). For the Jelly Mound to contribute to test data to this hypothesis, a cultural deposit must be present which post-dates A.D. 500 and which can be identified as either Yana or Wintu.

Questions of cultural chronology can be addressed through radiocarbon dates, obsidian hydration dating, and the cross-dating of temporally diagnostic artifacts as compared to other well-dated areal sites. It was anticipated that excavations at Jelly Mound would test for the presence of datable charcoal samples in cultural contexts, obsidian samples, and temporally significant artifacts. The latter could be compared to dated contexts in Dye Creek (Johnson 1984), Bend (Sundahl 1993), and work currently underway in the Turtle Creek area (Greg White personal communication 2001).

In addition to the archaeological assemblages outlined above, which date within the past 1500 years, older materials have been found in the Dye Creek and Bend areas. The oldest, dating from 4500 to 3000 B.P., is the Deadman Complex, which is characterized by large chert and basalt projectile points of the Deadman and other side-notched forms, large stemmed, and large unifacial leaf-shaped types, millingstones, manos, large disc-shaped and triangular Haliotis pendants, and other shell types. This was succeeded by the Kingsley Complex, dating between 3000 and 1500 B.P., which is similar in content but also contains mortars and pestles. The predominant projectile point styles are relatively short, broad expanding stem points of the Kingsley series and Southern Cascade side-notched points (Baumhoff 1957:28-32; Greenway 1982).

The identification of site function, settlement and subsistence patterns rely heavily on the discovery of features and the analysis of artifactual, floral, and faunal remains. It was planned that the investigations at Jelly Mound would attempt to recover artifacts and other cultural residues that could contribute to the identification of the use of the site, the season or seasons of occupation, and the subsistence strategies it supported.

Site structure deals with such factors as the distribution of household and community facilities and refuse areas relative to sex-based and rank-based division of labor, village arrangements with respect to defense, and household distance and the relative degree of food sharing and storage (White 1999; also see citations in White 1999). The attempt to identify these

distributions within a site seems to assume a single pattern throughout the history of the site, or if multiple components are present, the identification of the structure of each component. For the Jelly Mound site to contribute information to such a study would require the recovery of domestic features and their relationships to each other, and the identification of refuse piles of various types in a distinct spatial arrangement. Testing was expected to reveal if such features are present.

The reconstruction of lithic procurement strategies involves the identification of lithic materials and their source. Hamusek (1996:28-29, 47-48) draws a distinction between quarries and prospects. A prospect or assay site is a place where lithic raw material can be obtained by a group of people during their normal procurement strategy, but which lacks the quality and quantity of material found at a quarry (Wilke and Schroth 1989, cited in Hamusek 1996:28). Since lithic materials are known to occur at Jelly Mound, the site was expected to have data that could contribute to questions of lithic procurement. Samples of obsidian can be traced to source, although the presence of obsidian could be the result of trade rather than procurement strategies.

The development of models of regional landscape evolution is beyond the scope of the proposed testing at Jelly Mound. Some trenching and soil testing has previously taken place at the site and immediate vicinity and this information can be utilized. Stratigraphic profiles of unit sidewalls mapped during the excavations at the Jelly Mound site, coupled with textural analyses of soil samples, could provide information that can be compared to similar data from other areal sites.

In summary, it was planned that investigations at Jelly Mound would test for the presence of cultural materials which could provide information on dating and cultural chronology (charcoal samples from cultural contexts, obsidian samples for hydration, and temporally diagnostic artifacts), functional interpretations and site structure (features, functionally diagnostic artifacts, floral and faunal remains and technologically distinctive debitage), cultural identification (culturally distinctive features and artifacts/artifact complexes), and lithic procurement strategies (samples of lithic materials, obsidian samples which could be traced to source through X-ray fluorescence). If sufficient data are present, Jelly Mound could be eligible for the National Register of Historic Places under Criterion D, a site that is likely to yield information important in prehistory.

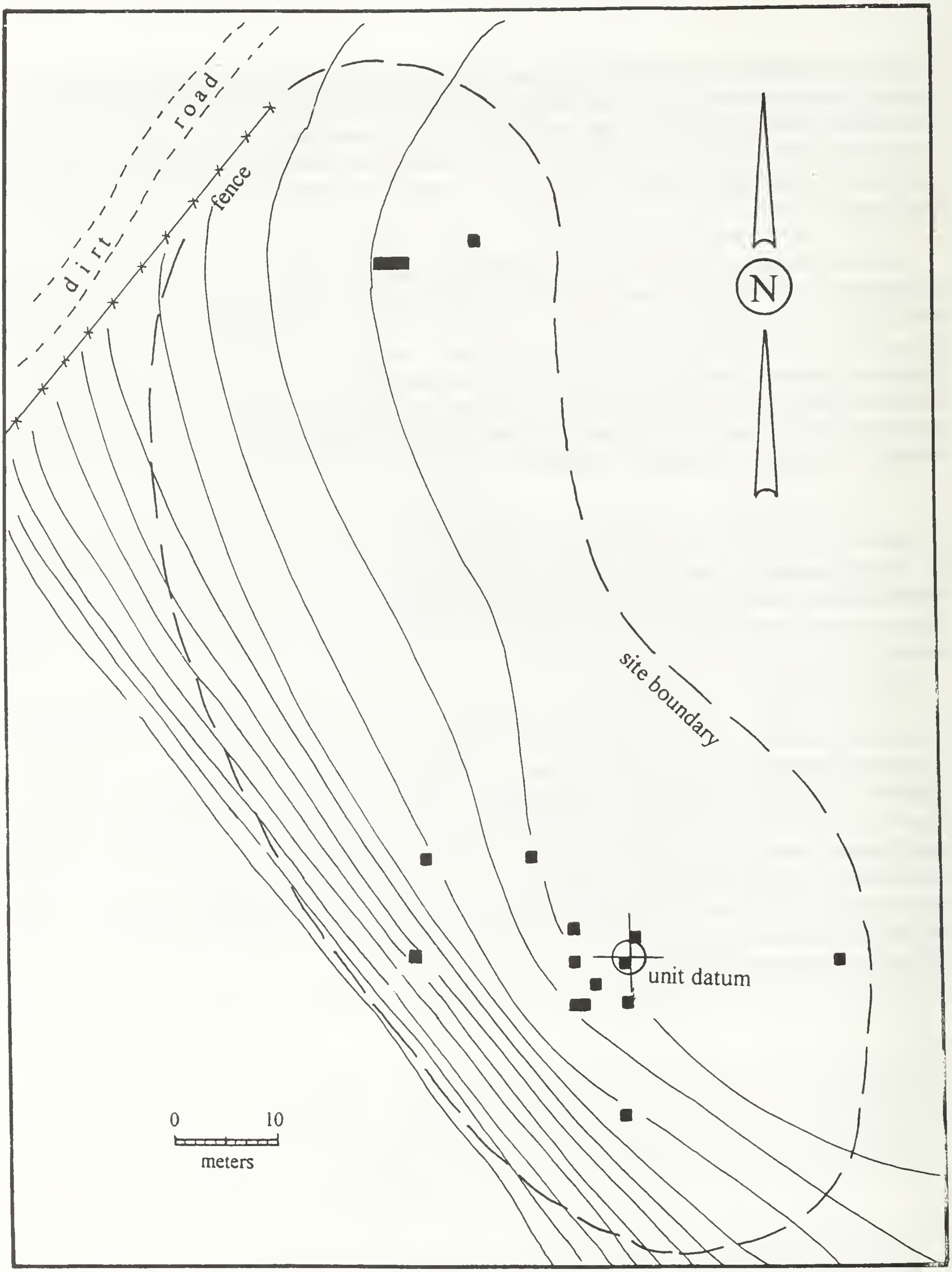


Figure 2. CA-TEH-1783 showing unit locations and contours in 10cm increments (base map prepared by Ed Clewett)..

CA-TEH-1783

Site Description

CA-TEH-1783 is situated on the southwestern edge of a river terrace approximately one kilometer (one-half mile) from the present course of the Sacramento River. The site, located about 110 meters (355 feet) above sea level, forms a slight mound rising at most 30cm or 40cm above the surrounding terrace, which is mapped as being composed of Holocene alluvium (Strand 1962). An older terrace rises abruptly some 300m to the northeast. A drainage channel adjoins on the southwest, carrying an intermittent creek. Dispersed or clustered oaks occur in the surrounding area, but the site is barren except for grasses, probably a function of its present use as a cow pasture and the past clearing of the oaks.

Geomorphologic studies were recently conducted in the area by Jack Meyer, Sonoma State University Anthropological Studies Center, who provided the following information. The site is located on the edge of an intermediate-aged terrace overlooking a narrow, younger terrace, which adjoins the drainage channel. The intermediate terrace was formed of alluviation from the Sacramento River, probably during the middle to late Holocene, 6000 to 3000 years ago, during a period of progressively westward channel migration. This terrace was subsequently abandoned by channel down cutting and incised by the overflow channel. The youngest terrace, which adjoins the channel, is probably only a few hundred years old and represents an active floodplain (Jack Meyer, personal communication 2001).

The prehistoric deposit is evidenced on the ground surface by a darkened soil, fragments of fire-altered rock, tools and flaking debris of basalt and obsidian, milling equipment including metates, hopper mortars, and a mano, and fragments of fresh-water mussel shell. The site was mapped as having cultural materials clustered into two loci. Locus 1 measures 70m by 50m and Locus 2, which lies approximately 20m farther north, is recorded as measuring 35m by 30m, for an overall site dimension of 120m north-to-south and 45m east-to-west. Surface artifacts were similar on both loci, and no features were noted on either. The ground surface has been repeatedly tilled and many surface and near surface artifacts exhibit the characteristic gouging scars. Several of the larger milling stones have probably been unearthed and moved from their original provenience to their present location along the barbed wire fence.

The Shasta College Field Archaeology class tested the site between January 19 and May 20, 2000. Twenty-five class members and other volunteers conducted excavations under the direction of Instructor Penni Carmosino. Diagnostic artifacts found on the surface were collected with the exception of large millingstones and mortars, which were measured, photographed, and left where they were found (most occur along the fence line where they probably were moved, possibly after being unearthed by the plow). A contour map of the site was prepared by S. Edward Clewett with contours shown in 10 centimeter increments (Figure 2).

TABLE 1
EXCAVATON UNITS AT CA-TEH-1783

EXCAVATION UNIT	MAXIMUM DEPTH/CM
0S-20E	20
2N-1E	50
3N-5W	60
10N-9W	50
10N-19W	60
68N-21W	30
68N-22W	60
68N-23W	60
70N-14W	40 + NE 1/4 to 60
0S-0W	60
0S-5W	60 + shovel test to 110
0S-20W	40
2S-3W	60 + NE 1/4 to 100
4S-OW	50
4S-4W	60
4S-5W	40 + S 1/2 to 60
15S-0W	60

A permanent site datum, a BLM survey corner marker, was established off-site on the north beside the fence and dirt road. A north-south baseline, oriented to true cardinal directions and tied to the permanent datum, was staked through the site, crossed by an east-west baseline. The intersection of these baselines, located 92 meters on a line 158 degrees 45 minutes from the permanent site datum, was utilized as the unit datum. Excavation units were oriented to this point with each unit designated by the distance from its northeast corner to the baseline intersection.

Seventeen one-meter square units were excavated, most to the base of the midden which varied in depth from 20cm to 60cm (see Table 1). Units were hand excavated in 10cm increments using trowels, picks, and shovels. Cultural materials and other data were recorded on level sheets for each level of each unit. Soils from most units were sifted through 1/4" mesh screens; 1/8" mesh was used in three units as a control for the collection of small-sized debitage and other cultural residues. A total of 9 cubic meters of midden was examined.

All excavated cultural materials except fire-affected rock were collected and placed in paper bags marked with unit location and level, and returned to the Shasta College Archaeology Lab for cleaning and cataloguing. Fire-affected rock was weighed in kilograms, noted on level sheets, and discarded at the site.

Soil Studies

A soil profile of 2S-3W was prepared by Eric Ritter (see Figure 3). Ritter divided the cultural levels into three strata. Stratum Ia, the rootlet zone, was less than 5cm thick. A fine sandy loam, hard and granular, it is brownish-gray in color (10YR 6/2 dry). There is a clear, wavy boundary between Ia and Ib. Stratum Ib is similar to Ia--both are part of the plow zone--with an occasional cobble, a few charcoal specks, and a few fine rootlets. The lower boundary at approximately 30cm in depth is clear and wavy.

Stratum II is a fine sandy loam, hard, granular to crumb in structure, and light yellowish-brown in color (10YR 6/4 dry). It extends from 30cm in depth to at least 1 meter, the base of the unit. Included within this stratum, primarily between 40 and 60cm in depth, is a large ash lens.

Soil samples collected from each of the strata in 2S-3W were submitted to the University of Wisconsin-Milwaukee Soils Laboratory for texture and basic soil chemistry analyses. Results, shown as Table 2, indicate that while an off-site sample was classed as a loam with a slightly acid pH, all levels of the cultural deposit are a sandy loam with pH values in the alkaline range. The third sample, obtained from the ash lens at a depth of 45-52cm, has the highest pH values.

The highest values of organic carbon and organic matter are found in Stratum I. Similarly, the Total P readings, a reflection of levels of human activity and resultant residues, are highest in Stratum I and the ash lens, and drop off dramatically in Stratum II, where they are comparable with the off-site reading. While the P readings and pH are significantly higher than the off-site background reading, the level of human activity subjectively appears "moderate."

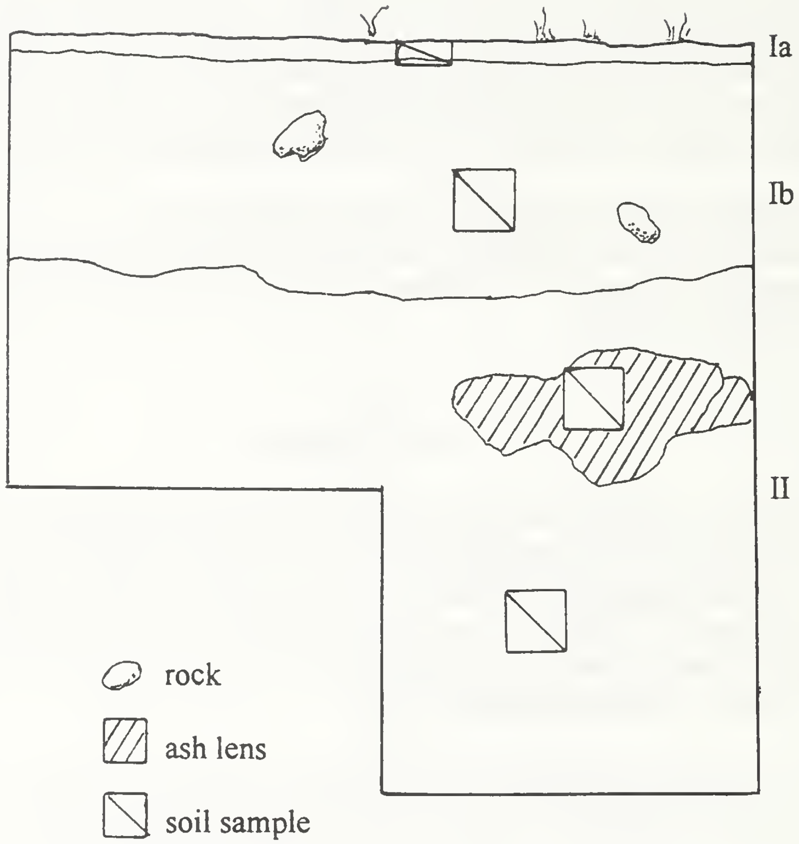


Figure 3. Stratigraphic profile of the north wall of 2S-3W.

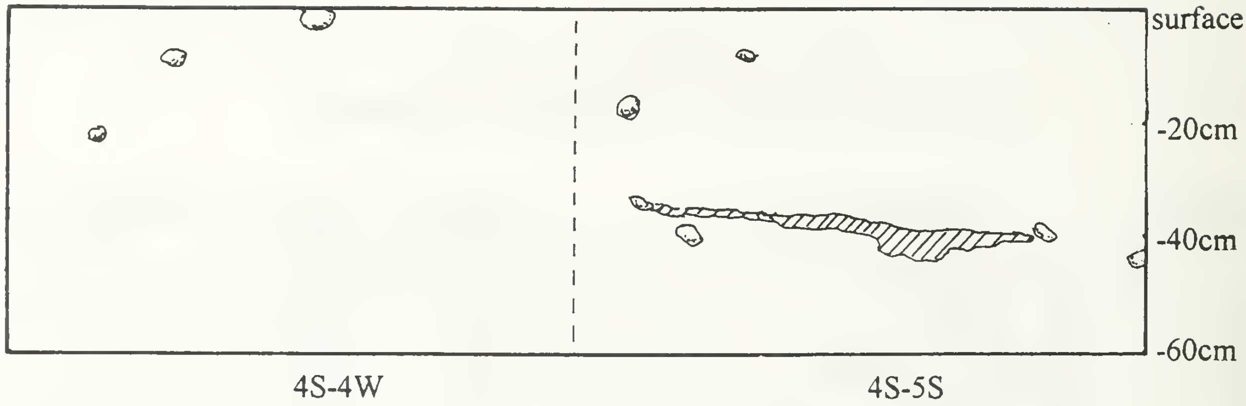
TABLE 2
RESULTS OF SOILS ANALYSES
(University of Wisconsin-Milwaukee Soils Laboratory)

Lab ID	Sample Description	% Sand	% Silt	% Clay
1	Ia, 0-10cm	56	32	12
2	Ib, 20-25cm	59	29	12
3	Ash lens, 45-52cm	55	35	10
4	II, 75-80cm	55	32	13
5	Off-site sample, 0-5cm	45	40	15

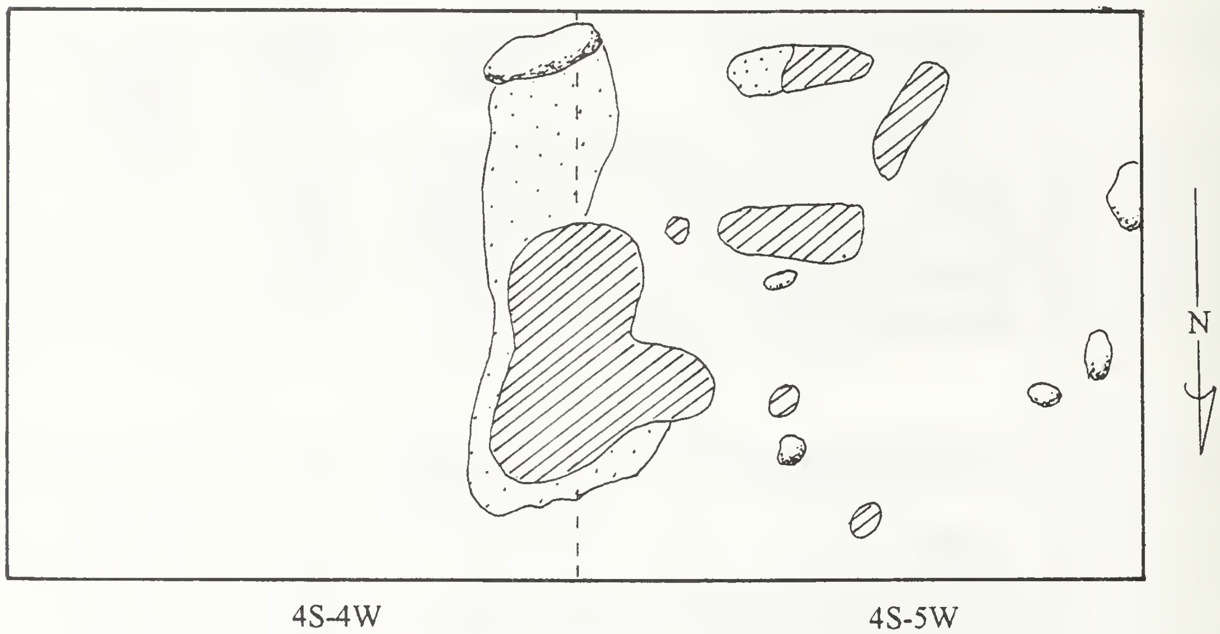
Lab ID	Sample Description	Total P mg/kg	Organic Carbon %	Estimated Organic Matter %
1	Ia, 0-10cm	1131.8	2.17	3.7
2	Ib, 20-25cm	1210.3	1.45	2.5
3	Ash lens, 45-52cm	1196.2	0.87	1.5
4	II, 75-80cm	567.4	0.33	0.6
5	Off-site sample, 0-5cm	703.2	1.13	1.9

Lab ID	Sample Description	Carbonate (LOI) %	pH	Exch. Mg mg/kg
1	Ia, 0-10cm	1.2	7.3	78.4
2	Ib, 20-25cm	1.6	7.9	115.3
3	Ash lens, 45-52cm	3.1	8.1	156.4
4	II, 75-80cm	1.2	7.7	113.6
5	Off-site sample, 0-5cm	1.2	5.8	450.6

Profile of the south wall of 4S-4W and 4S-5W



Plan view of Feature 2 at 34cm in depth



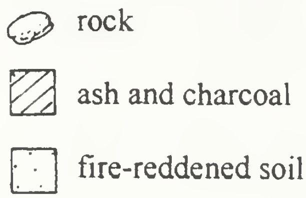


Figure 4. Plan view and profile of Feature 2.

Features

Two features were formally recorded and photographed during the field excavations and a third was later assigned a Feature number for reference. All three consisted of concentrations of charcoal, ash, and fire-reddened soil and are interpreted as fire hearths.

Feature 1

This feature was comprised of patches of heavily oxidized soil, charcoal, and a concentration of fire-affected rock. It was first encountered at a depth of 24cm in 68N-22W. As it extended into adjoining units, 68N-21W and 68N-23W were excavated to further expose the feature. The oxidized soil was dark red in color (2.5YR 3/2) compared to a dark brown matrix (10YR 3/3) with pH values from 7.0 to 7.5. Flecks of charcoal were found throughout. Fire-affected rock was extremely abundant at 50cm in depth, below the oxidized soil and charcoal. Some faunal fragments were been associated.

A bulk soil sample was collected in hopes of recovering sufficient charcoal for radiocarbon analysis, but not enough was found for standard processing.

Feature 2

Feature 2 was recorded between 30cm and 60cm in depth in 4S-4W and 4S-5W. It consisted of an ash lens, charcoal, and fire-discolored soil (Figure 4). Fire-affected rock was present to a depth of 50cm, but not below. The ash, with a pH of 8.0, was light-gray in color (10YR 7/2) in a matrix of very dark grayish-brown (10YR 3/2) soil with a pH ranging from 7.0 to 8.0.

Abundant charcoal was recovered and was submitted for radiometric analysis, resulting in a date of 550 $\pm$ 60 BP.

Feature 3

This designation is assigned to an ash lens found at the 40-50cm level of 2S-3W (see Figure 3). Found within a dark brown soil matrix (7.5 YR 3/4), the ash produced a pH value of 8.1 (see Table 2).

Analysis of the abundant charcoal, recovered from 30cm to 60cm in depth, resulted in a conventional radiocarbon age of 480 $\pm$ 60 BP.

TABLE 3
OBSIDIAN HYDRATION MEASUREMENTS IN MICRONS FROM CA-TEH-1783

Cat. #108-	Unit	Depth/cm	Mean Value	Source*
-140a	0S-0W	0-10	1.1	T
-140b	"	"	4.6	T
-143a	"	10-20	1.1	T
-143b	"	"	1.2	T
-143c	"	"	2.0	T
-143d	"	"	2.1	T
-143e	"	"	1.0	T
-149a	"	20-30	2.0	T
-149b	"	"	1.0	T
-149c	"	"	2.0	T
-155a	"	30-40	1.7	T
-155b	"	"	1.2	T
-155c	"	"	1.9	T
-161a	"	40-50	1.1	T
-161b	"	"	0.9	T
-170	0S-5W	0-10	3.2	GF
-174a	"	10-20	2.7	GF
-174b	"	"	2.7	GF
-178a	"	20-30	2.6	GF
-178b	"	"	2.6	GF
-178c	"	"	3.0	GF
-178d	"	"	2.5	GF
-178e	"	"	2.7	GF
-178f	"	"	2.7	GF
-182a	"	30-40	2.5	GF
-182b	"	"	2.5	GF
-182c	"	"	2.8	GF
-182d	"	"	2.5	GF
-186	"	40-50	2.5	GF
-191	"	50-60	2.4	GF

* all source determinations are visual

Dating Analyses

Two methods were used to assign a chronological date to the cultural deposit at CA-TEH-1783. Thirty obsidian samples were chosen for hydration analyses and two charcoal samples were submitted for radiometric dating.

Although most of the obsidian from the site appears to be derived from the Tuscan source, located on the eastern edge of the Sacramento Valley south of the Pit River, a small percent, primarily from one unit, visually matches obsidian from the Grasshopper Flat/Lost Iron Wells source in the Medicine Lake Highlands. The 30 specimens chosen for analysis included 15 pieces from 0S-0W, all visually assigned to the Tuscan obsidian source (designated T on Table 3), and 15 from 0S-5W, all believed to be Grasshopper Flat/Lost Iron Wells (GF) obsidian. This sample was sent to Tom Origer, Sonoma State University Anthropological Studies Center's obsidian hydration laboratory, for analysis. Source assignments were based on the author's extensive experience with these geochemical sources. Origer also examined each specimen as to source assignment and agreed with the author's determinations.

Results of the obsidian hydration measurements appear as Table 3. With one or two exceptions, all hydration values are consistent with a late prehistoric age determination. The exceptions may represent older flake scars, already present on the obsidian when it was brought to the site.

Two samples, each about 20 grams of charcoal, were forwarded to Beta Analytic, Inc., for standard radiometric analysis. Both samples were taken from features as reported above. Each sample provided plenty of carbon for accurate measurements and the analyses went normally.

Results of the analyses, shown as Table 4, indicate a single late prehistoric habitation. Calibrations were calculated using 1998 calibration databases. A two-sigma calibration places both dates between AD 1300 and AD 1500. These dates are entirely consistent with the obsidian hydration readings.

TABLE 4
RADIOMETRIC DATES FROM CA-TEH-1783

Sample #	Provenience	Radiocarbon Age
Beta-151869	Feature 2, 4S-4W, 30-60cm	550 $\pm$ 60 BP
Beta-151870	Feature 3, 2S-3W, 30-60cm	480 $\pm$ 60 BP

TABLE 5
SUMMARY OF CULTURAL MATERIALS FROM CA-TEH-1783

Description	Obsidian	Metavolcanic	Other
projectile points			
Gunther Series	2		
corner-notched	2		
fragments	4		
biface	1		
drill		1	
edge-modified flakes		12	
cobble tools		11	
cores	1	14	
debitage	351	759	
net weights		4	
pestles		2	
mano		1	
mortars		3	
mortar/metate combinations		2	
hammerstones		2	
scratched stones		2	
faunal fragments			114
Margaritinopsis shell fragments			702 gr.
spiral snail shells and fragments			636
Totals	361	813	750 +

Cultural Materials

Other than fire-affected rock, which was weighed and discarded at the site, cultural materials recovered through excavation were returned to the Shasta College Archaeology Laboratory for processing. Sixty artifacts, 1110 pieces of debitage, 114 faunal fragments, and more than 1000 shells and shell fragments were catalogued into Accession 108. A summary appears as Table 5.

All artifacts are made of stone, with artifacts and debitage of metavolcanic materials outnumbering obsidian by more than two to one. There is nearly a complete separation between the two materials with all projectile points and the single biface being made of obsidian and all edge-modified flakes of metavolcanic. Only the drill, which might be expected to be obsidian, is made of a basalt or metavolcanic material.

Projectile Points

Eight bifacial artifacts are classed as projectile points, four of them complete enough to assign to a type while the other four are too fragmentary. Two of the points belong to the Gunther Series and two are medium-sized corner-notched points. All are broken to some extent and complete measurements and weights are not possible. Both Gunther points, however, are 3mm in thickness while both corner-notched points are 5mm thick. Proveniences and extant dimensions appear in Table 6.

TABLE 6
PROVENIENCES, DIMENSIONS AND WEIGHTS OF PROJECTILE POINTS
millimeters and grams

Cat. #	Description	Provenience/cm	Length	Width	Thickness	Hafting Width	Weight
108-							
17	corner-notched	2N-1E/20-30	-	25	5	12	2.8+
21a	base	2N-1E/30-40	-	-	3	8	-
143f	midsection	0S-0W/20-30	-	-	3	-	-
148	narrow tip	0S-0W/20-30	-	-	-	-	-
161c	base	0S-0W/40-50	-	-	2	-	-
237	Gunther	4S-0W/0-10	-	12	3	-	0.4+
262	corner-notched	0S-0W/0-10	(24)	(18)	15	9	1.7+
309	Gunther	4S-5W/30-40	-	(17)	3	-	0.7+

( ) estimated value

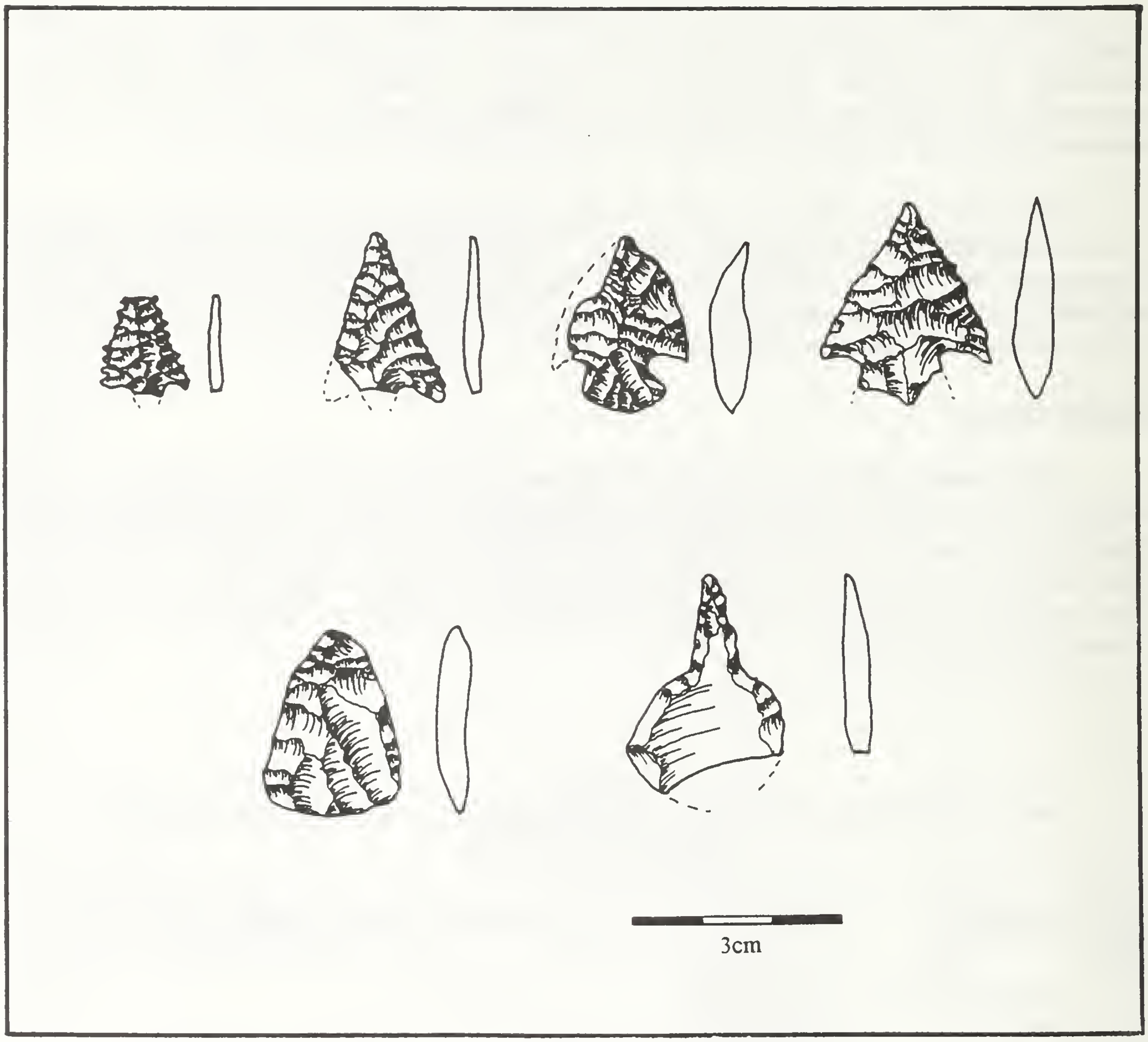


Figure 5. Projectile points (Cat. nos. left to right are 108-237, -309, -262, and -17), biface (108-283), and drill (108-45) from CA-TEH-1783.

One Gunther Series point is notably smaller than the other (Figure 5, top left). Blade edges are straight and lightly serrated. The tangs are slightly asymmetrical with one slightly more acute than the other. The larger Gunther also has straight blade edges. Stems are missing in both.

Blade edges are also straight on the larger of the two corner-notched points (Figure 5, top right). The other is missing one lateral edge but has a convex edge shape on the extant blade. The latter has a convex basal margin while the base is missing on the former point.

Biface

One complete obsidian biface, Cat. #108-263, was recovered from the 40-50cm level of 4S-4W. Roughly triangular in shape (Figure 5, bottom left), it measures 27mm in length, 20mm in width, 4mm in thickness, and weighs 2.2 grams. It is percussions flaked with no attempt to pressure flake the edges. The tip is quite thick, possibly preventing its completion into a finished projectile point. Apparent utilization of the edge suggests it served as a knife.

Drill

The single drill (Cat. #108-45) recovered from the site is made of basalt or metavolcanic material. It has a wide roughly oval-shaped handle, unifacially thinned, and a long narrow "bit" (Figure 5, bottom right) which is plano-convex in cross-section and bifacially formed. The handle is slightly broken, but measurements are 30mm or more in length, 23mm in width, 4mm thick, and it weighs 2.2 grams. It was recovered from the 30-40cm level of 3N-5W.

Edge-Modified Flakes

All 12 edge-modified flakes from CA-TEH-1783 are made of metavolcanic material. Edge retouching varies from minimal to 75% of the distance around the perimeter, but is less than 50% in nearly all cases. Virtually all are unifacially modified with modification on either the dorsal (Figure 6, left) or ventral face.

Maximum lengths vary from 80mm to 42mm with a mean of 63mm. Weights vary from 164.3g to 24g, averaging 77.5g; all but two are less than 100g. Edge angles vary from 30 to 68 degrees with a mean of 50 degrees and standard deviation of 13 degrees. Sizes, weights, and proveniences appear as Table 7.

A number of other fairly sizeable flakes of metavolcanic material appear utilized (Figure 6, right), but do not exhibit edge retouch. These were grouped with the debitage.

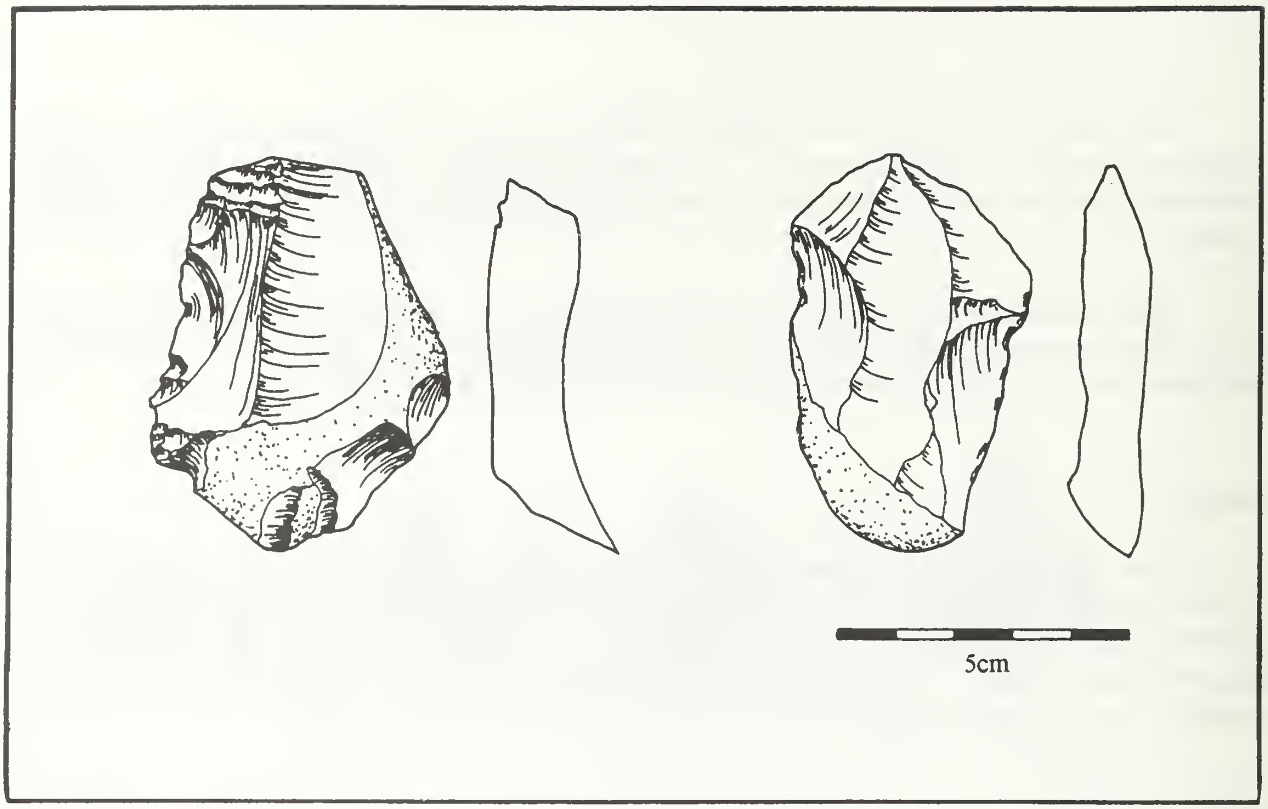


Figure 6. Edge-modified flake (Cat. #108-151) and utilized flake (108-301).

TABLE 7
PROVENIENCES, DIMENSIONS AND WEIGHTS OF EDGE-MODIFIED FLAKES
millimeters and grams

Cat. #	Provenience/cm	Length	Width	Thickness	Weight
108-					
-39	3N-5W/20-30	58	35	15	31.4
-131	68N-23W/50-60	51	47	14	33.2
-151	0S-0W/20-30	67	51	18	62.2
-163	0S-0W/40-50	66	54	20	86.4
-176	0S-5W/10-20	79	77	29	164.3
-205	2S-3W/0-10	42	34	14	24.2
-210	2S-3W/10-20	80	77	27	154.7
-215	2S-3W/20-30	-	-	12	-
-245	4S-0W/10-20	66	52	23	69.2
-297	4S-5W/0-10	58	54	20	62.7
-305	4S-5W/10-20	69	67	18	96.2
-312	4S-5W/30-40	57	44	28	67.8

Debitage

A total of 275 pieces of obsidian debitage and 752 fragments of metavolcanic material was collected through 1/4" mesh from the 17 units. The distribution of obsidian by number of flakes and total weight per level is shown in Table 8 and that for metavolcanic flakes appears as Table 9. Soils from three units were sifted through 1/8" screens, resulting in an additional 76 obsidian flakes and 7 metavolcanic flakes, all from 0S-0W; no smaller flakes were recovered from either 68N-21W or 68N-22W. Obsidian from 0S-0W was passed through a 1/4" screen in the lab for comparative purposes. Only 32% was caught in the 1/4," indicating that slightly more than two-thirds of the debitage 1/8" and larger was lost from the other units that contained sizeable quantities of obsidian.

The 112 pieces of obsidian debitage from 0S-0W were individually examined as to size and flake type. Although one utilized fragment measures a maximum of 23mm, all others are less than 20mm. Excluding fragments, 32% are less than 10mm in maximum size and 68% are between 10 and 20mm.

Nearly 37% of the obsidian debitage is classed as core reduction flakes; 8% are early stage core reduction, which retain between 50% and 100% cortex, while 29% have less than 50% cortex remaining. These are generally straight to semi-curved in cross-section with a single faceted platform. The percentage of cortex is not surprising in that Tuscan obsidian generally occurs in cortical-covered medium to small-sized cobbles, and their reduction produces considerable cortical waste. Twenty-one percent of the obsidian debitage is classed as biface thinning flakes, more than ¾ of which are less than 10mm in size. These are thin, usually concave on the ventral surface, sometimes twisted in cross-section, with multidirectional dorsal scars and complex platforms. Four percent are platform preparation flakes with wide, thick platforms relative to flake length, 4% are pressure flakes, and 36% are too fragmentary to classify.

The 85 metavolcanic flakes from 0S-0W range in maximum size from 70mm to less than 10mm. Excluding broken flakes, 5% are less than 10mm in size, 39% are between 10 and 20mm, 22% are 20 to 30mm, 20% are 30 to 40mm, and only 4% each are 40 to 50mm, 50 to 60mm, and 60-70mm in size.

The metavolcanic flakes are predominantly classified as early and late stage core reduction flakes; 17% are early core with greater than 50% cortex remaining and 45% are late stage core reduction flakes; 18% of the metavolcanic debitage is classed as platform preparation flakes and 18% is fragmentary. No biface thinning flakes were found among the metavolcanic debitage.

It is primarily the late stage core reduction flakes that show evidence of edge utilization (see Figure 6, right) or which would have been suitable for such use as cutting. Edge angles were measured on eight utilized specimens, producing figures between 32 degrees and 46 degrees with a mean of 39 degrees.

TABLE 8

DISTRIBUTION OF OBSIDIAN DEBITAGE AT CA-TEH-1783 BY NUMBER AND WEIGHT IN GRAMS

(1/4-inch fraction)

DEPTH/cm	0S-20E	2N-1E	3N-5W	10N-9W	10N-19W	68N-21W
0-10	-	3/0.3	4/1.9	3/4.8	1/0.3	3/0.1
10-20	2/0.3	3/0.9	2/1.4	-	3/0.4	2/0.5
20-30		8/3.7	5/2.6	1/1.0	2/0.6	-
30-40		4/0.9	1/0.1	2/1.3	-	-
40-50		1/0.1	4/0.7	1/0.3	1/0.1	
50-60			1/0.1		-	

DEPTH/cm	68N-22W	68N-23W	70N-14W	0S-0W	0S-5W	0S-20W
0-10	-	2/1.8	-	10/1.2	1/0.3	2/0.3
10-20	1/0.2	-	-	12/4.8	11/2.7	1/1.7
20-30	-	1/0.5	-	8/1.6	11/4.9	-
30-40	-	-	1/0.4	5/1.1	9/2.7	2/0.4
40-50	-	-	-*	1/0.1	1/0.2	
50-60	-	-	-*	-	2/0.8	

DEPTH/cm	2S-3W	4S-0W	4S-4W	4S-5W	15S-0W
0-10	5/1.5	7/1.3	2/0.5	5/0.9	-
10-20	4/2.0	14/4.6	4/3.5	7/2.6	3/0.4
20-30	13/3.3	1/0.2	5/1.8	3/1.8	1/0.2
30-40	21/5.5	3/0.4	7/1.0	5/2.6	2/0.3
40-50	6/1.2	4/0.5	1/0.2	2/0.4	3/0.6
50-60	2/0.7		2/0.3	-	1/0.1
60-70	3/0.6*				
70-80	1/0.3*				
80-90	-*				
90-100	-*				

* northeast one-quarter only

TABLE 9

DISTRIBUTION OF METAVOLCANIC DEBITAGE AT CA-TEH-1783 BY NUMBER AND WEIGHT IN GRAMS

(1/4-inch fraction)

DEPTH/cm	0S-20E	2N-1E	3N-5W	10N-9W	10N-19W	68N-21W
0-10	9/111.0	9/185.9	17/99.0	20/305.7	10/104.5	11/380.7
10-20	4/42.5	14/171.4	13/59.6	8/150.3	13/175.2	4/19.0
20-30		11/28.0	12/161.3	15/105.0	4/35.2	5/117.7
30-40		7/73.2	12/67.5	19/160.3	4/48.6	
40-50		5/18.0	8/64.3	6/98.0	-	
50-60			5/54.6		-	

DEPTH/cm	68N-22W	68N-23W	70N-14W	0S-0W	0S-5W	0S-20W
0-10	11/129.0	19/166.1	9/106.9	19/67.0	6/8.8	8/89.3
10-20	15/152.7	7/39.6	10/31.8	19/48.1	9/41.3	4/42.3
20-30	4/5.1	8/99.7	6/16.3	29/310.5	16/105.7	7/67.7
30-40	14/80.0	11/111.8	-	6/37.3	10/9.7	2/1.0
40-50	4/5.1	-	-*	2/3.3	5/6.0	
50-60	3/13.1	3/210.4	-*	3/2.4	1/0.2	

DEPTH/cm	2S-3W	4S-0W	4S-4W	4S-5W	15S-0W
0-10	11/233.2	18/380.2	9/263.0	11/84.7	12/70.8
10-20	16/233.8	16/124.4	8/53.3	11/134.5	9/32.5
20-30	14/84.8	9/0.9	11/93.6	11/164.0	6/24.4
30-40	2/29.5	8/267.5	10/87.8	14/53.0	2/14.0
40-50	5/52.9	4/3.1	7/6.5	4/51.9	2/2.4
50-60	3/5.2		3/47.0	1/2.5	-
60-70	-*				
70-80	-*				
80-90	-*				
90-100	-*				

* northeast one-quarter only

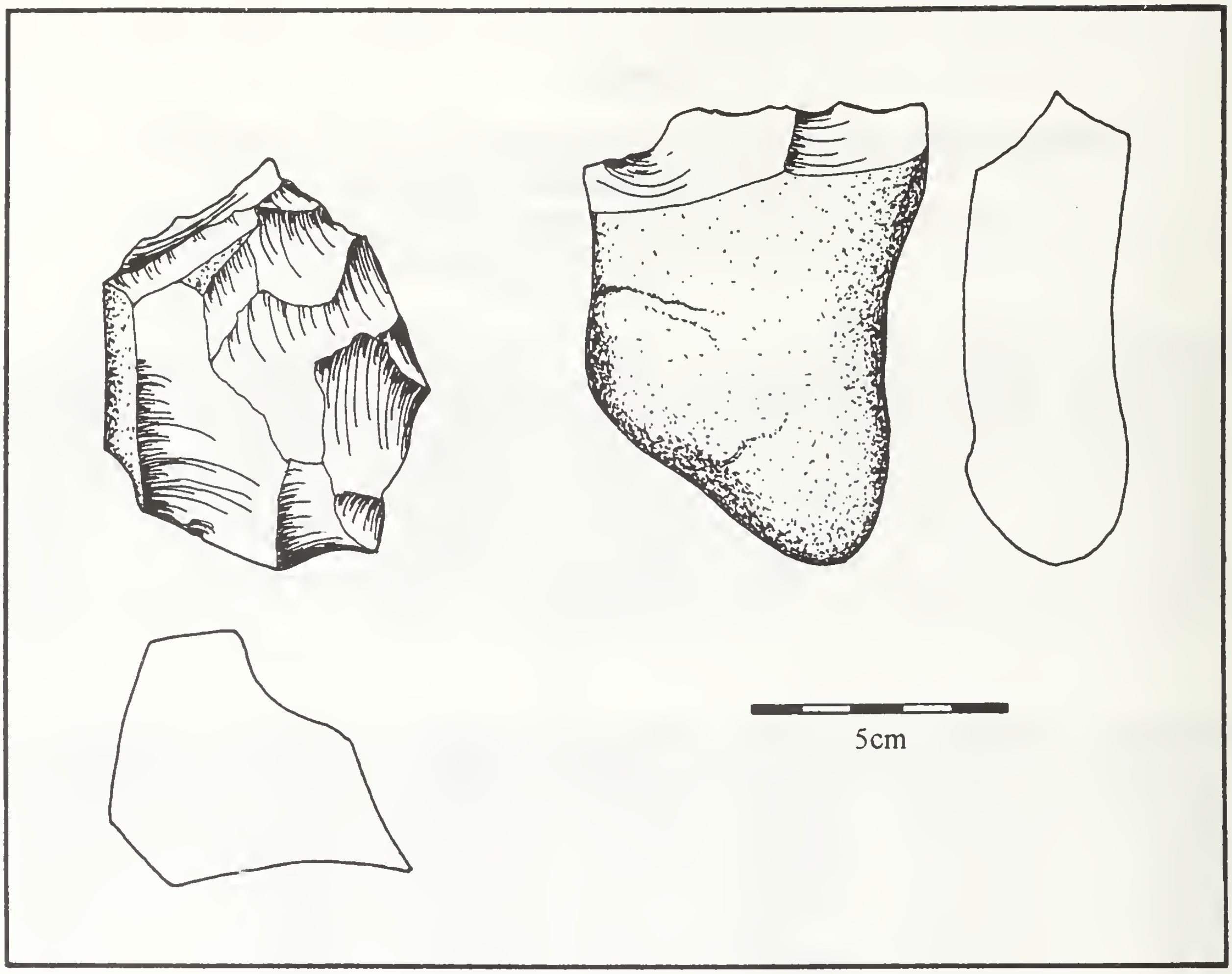


Figure 7. Cobble tools from CA-TEH-1783; (left is Cat. #108-145, right is #108-261).

TABLE 10
PROVENIENCES, DIMENSIONS AND WEIGHTS OF COBBLE TOOLS
millimeters and grams

Cat. #	Provenience/cm	Length	Width	Thickness	Weight
108-					
-11	2N-1E/0-10	85	35	32	163.2
-31	3N-5W/0-10	56	44	27	66.2
-60	10N-9W/0-10	89	78	48	336.9
-91	68N-21W/0-10	80	60	54	275.0
-95	68N-21W/10-20	73	70	29	112.5
-137	70N-14W/10-20	81	68	24	203.4
-145	0S-0W/10-20	80	65	45	203.6
-152	0S-0W/20-30	60	38	35	72.8
-157	0S-0W/30-40	58	57	35	85.3
-184	0S-5W/30-40	80	60	39	173.2
-261	2S-3W/40-50	90	68	33	285.8

Cobble Tools and Cores

With the exception of one obsidian core, all specimens in this group are the metavolcanic material that is readily available in gravel bars along the river. The distinction between tools and cores is somewhat subjective, but is based on the presence or absence of secondary edge modification, utilization, and edge angles. Those classified as tools are less variable in dimensions and edge angles.

The eleven specimens classed as cobble tools range in maximum length from 56 to 90mm (Table 10) with a mean of 75mm. Edge angles vary from 52 degrees to 75 degrees with a mean of 62 degrees. Nine have bifacial edge modification and the other two are unifacially modified. Most modification is fairly minimal although a few have been retouched around three-fourths of the perimeter (Figure 7).

The fourteen cores have a much larger size range, varying from 36mm to 111mm in maximum length (Table 11) with a mean of 66mm. The standard deviation is 18mm compared to 12mm for the cobble tools. Edge angles predominantly are greater than 70 degrees. Six are single platform cores with minimal reduction. Four are irregular multiplatform cores. The remainder are small remnants or odd fragments.

The obsidian core (Cat. #108-263) is a thick pebble which retains considerable cortex, but is bifacially flaked on one edge. Recovered from the 0-10cm level of 0S-0W, it measures 24mm by 17mm by 11mm and weighs 4.3 grams.

TABLE 11
PROVENIENCES, DIMENSIONS AND WEIGHTS OF CORES
millimeters and grams

Cat. #	Provenience/cm	Length	Width	Thickness	Weight
108-					
-3	surface	80	78	63	566.8
-23	2N-1E/30-40	72	70	26	171.2
-82	10N-19W/20-30	66	55	40	158.2
-104	68N-22W/10-20	52	43	32	72.4
-109	68N-22W/30-40	85	76	37	249.6
-206	2S-3W/0-10	50	38	35	48.6
-221	2S-3W/30-40	45	39	35	45.5
-241	4S-0W/0-10	111	68	51	455.0
-246	4S-0W/10-20	58	39	24	47.7
-270	4S-4W/10-20	75	62	25	130.7
-275	4S-4W/20-30	66	41	35	103.7
-286	4S-4W/40-50	62	45	21	62.7
-313	4S-5W/30-40	73	59	32	191.4
-337	15S-0W/30-40	36	31	27	24.8

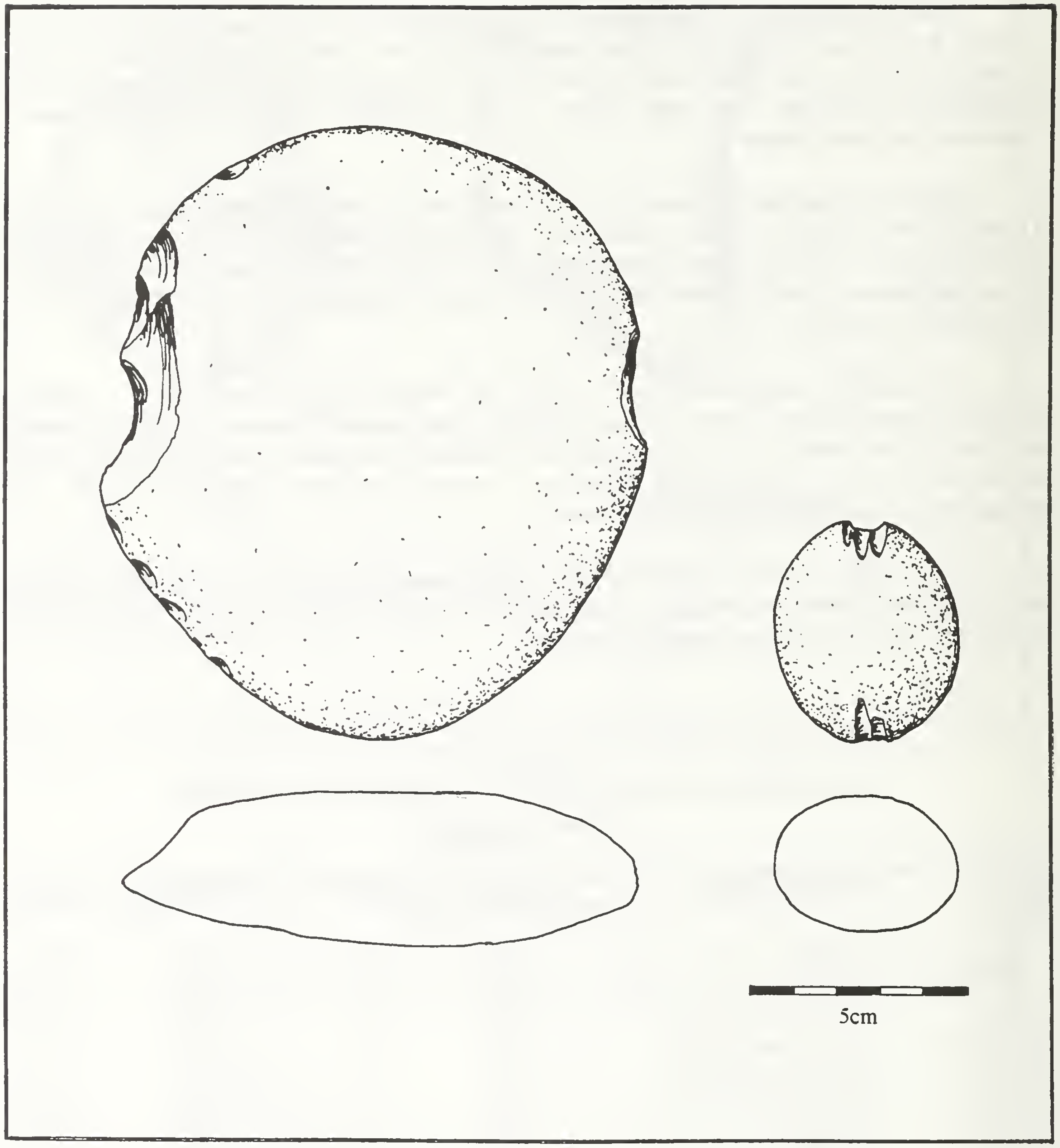


Figure 8. Net weights from CA-TEH-1783; (left is Cat. #108-1, right is 108-319).

Net Weights

Net weights bridge the distinction between flaked stone and ground stone artifacts. They are formed by flaking notches on the perimeter of a round stone, and then grinding the flaked edges so as not to cut the twine that attached to them

The four net weights from CA-TEH-1783 include three cobbles and one pebble. Proveniences, dimensions and weights appear as Table 12.

The cobbles, all of andesite, are similar in that all are flattish in cross-section and each has one or more edge notches. Notches on the two larger specimens oppose each other on the lateral edges (Figure 8, left). The third, somewhat smaller, is fragmentary, but has a single notch on the extant end; the opposite end is missing. Unlike most notched-pebble net weights seen in the area, these specimens from CA-TEH-1783 are unifacially notched.

The fourth specimen is much smaller and differs in being relatively thicker than those described above. Notches, located at the ends (Figure 8, right), appear more ground than flaked, but may have been formed by bifacial flaking and then extensive grinding to create grooves that measure 8mm or 9mm across and 1mm in depth.

TABLE 12

PROVENIENCES, DIMENSIONS AND WEIGHTS OF NET WEIGHTS
millimeters and grams

Cat. #	Provenience/cm	Length	Width	Thickness	Weight
108-					
-1	surface	139	121	37	901.1
-2	surface	128	122	20	484.2
-188	0S-5W/40-50	(130)	72	18	-
-319	4S-5W/40-50	50	42	32	95.3

( ) estimated value

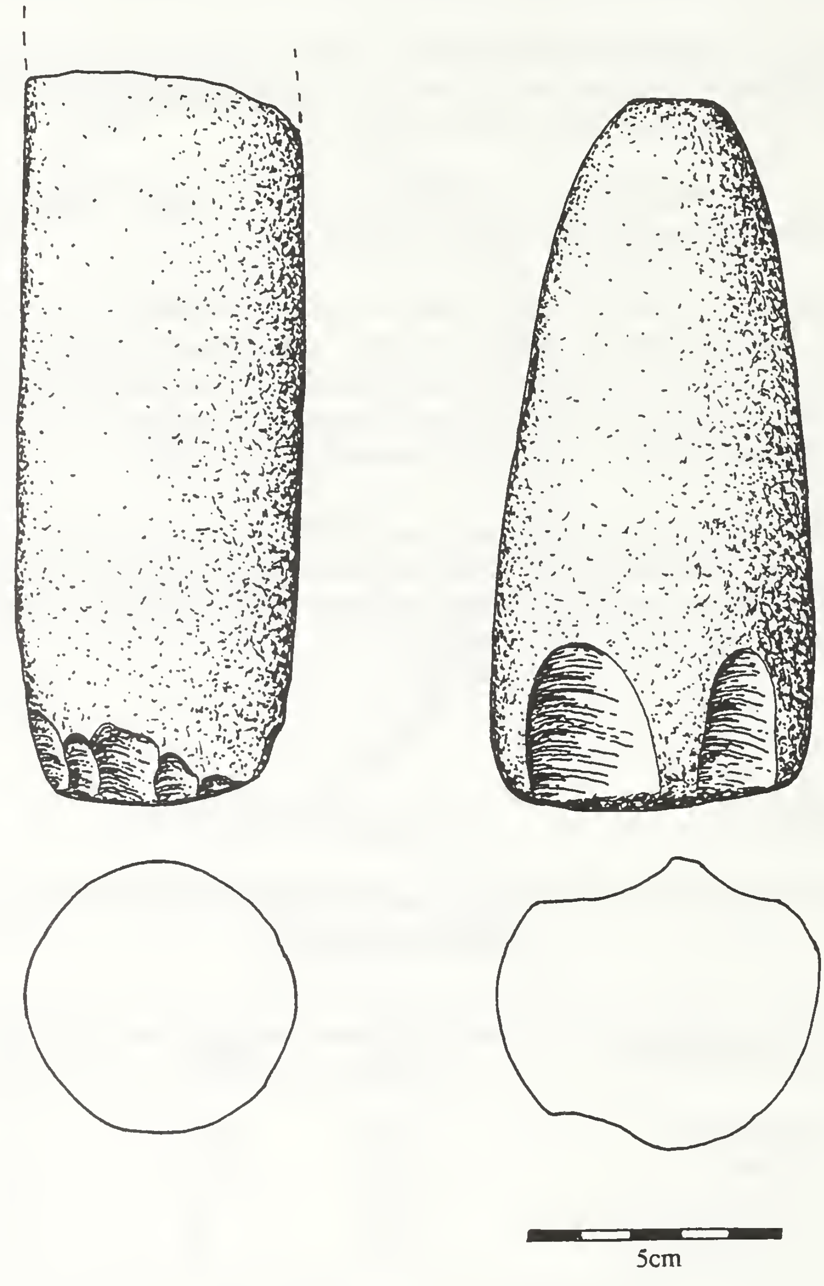


Figure 9. Pestles from CA-TEH-1783; (Cat. #108-4 on left, 108-332 on right).

Pestles

Both of the pestles recovered from the site are shaped, ground and highly polished. One is cylindrical in shape and the other is a conical pestle.

The cylindrical pestle (Cat. #108-4), a dense metavolcanic material, was found on the ground surface in the southern part of the site. It is broken in length, its extant length being 140mm, and its diameter is 55mm. The extant piece weighs 850 grams. The base is flattened with some spalling around the edge (Figure 9, left).

The conical pestle (108-332), metavolcanic in material, is 144mm in length, 61mm in width and 57mm thick, and weighs 742.5 grams. Both ends are flattened. The larger end is heavily spalled (Figure 9, right). The smaller end measures 20mm by 14mm in size. This artifact was recovered from the 20-30cm level of 15S-0W.

Mano

A single mano (Cat. #108-12) was found in the 0-10cm level of 2N-1E. An irregularly shaped cobble of vesicular metabasalt, it measures 109mm in length, 80mm in width and 54mm in thickness, and weighs 690.7 grams. It has a single flattish, highly polished face which measures 99mm by 76mm and curves slightly around the two sides of the cobble (Figure 10).

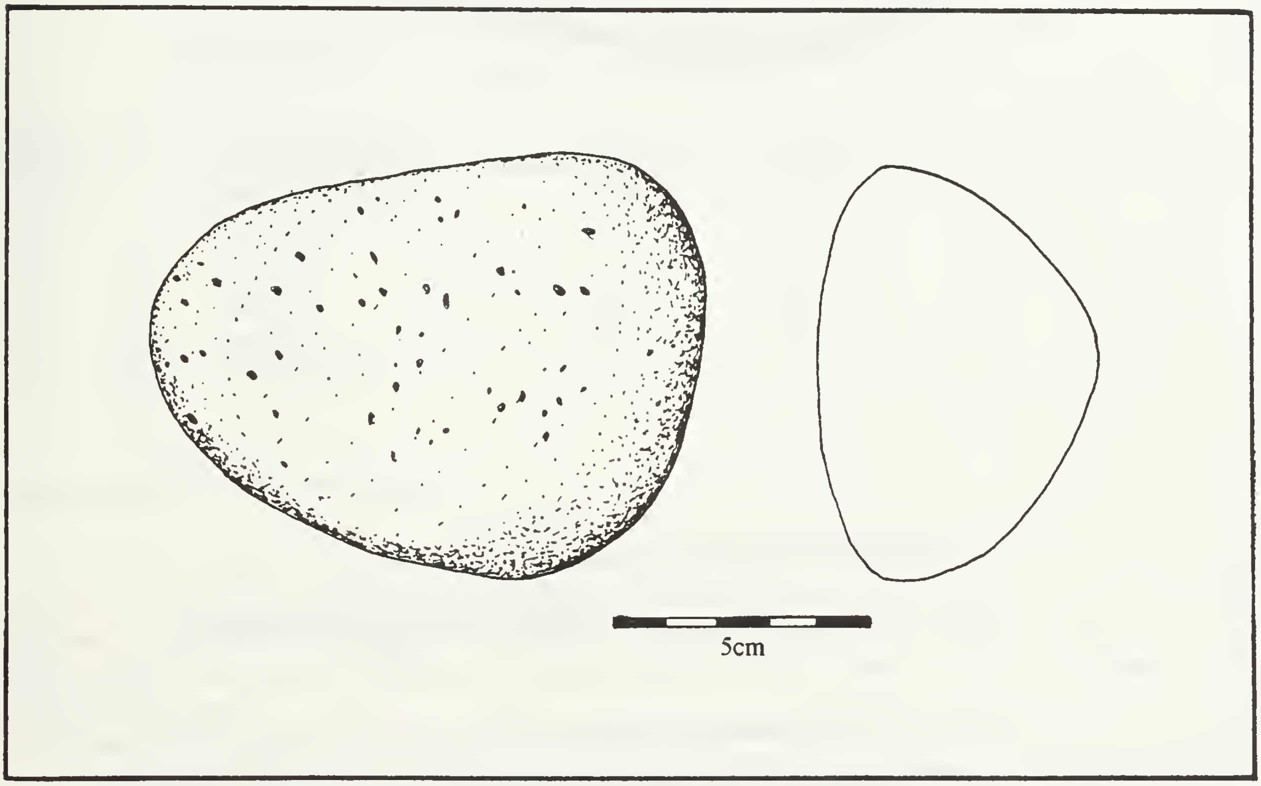


Figure 10. Mano from CA-TEH-1783; (Cat. #108-12).

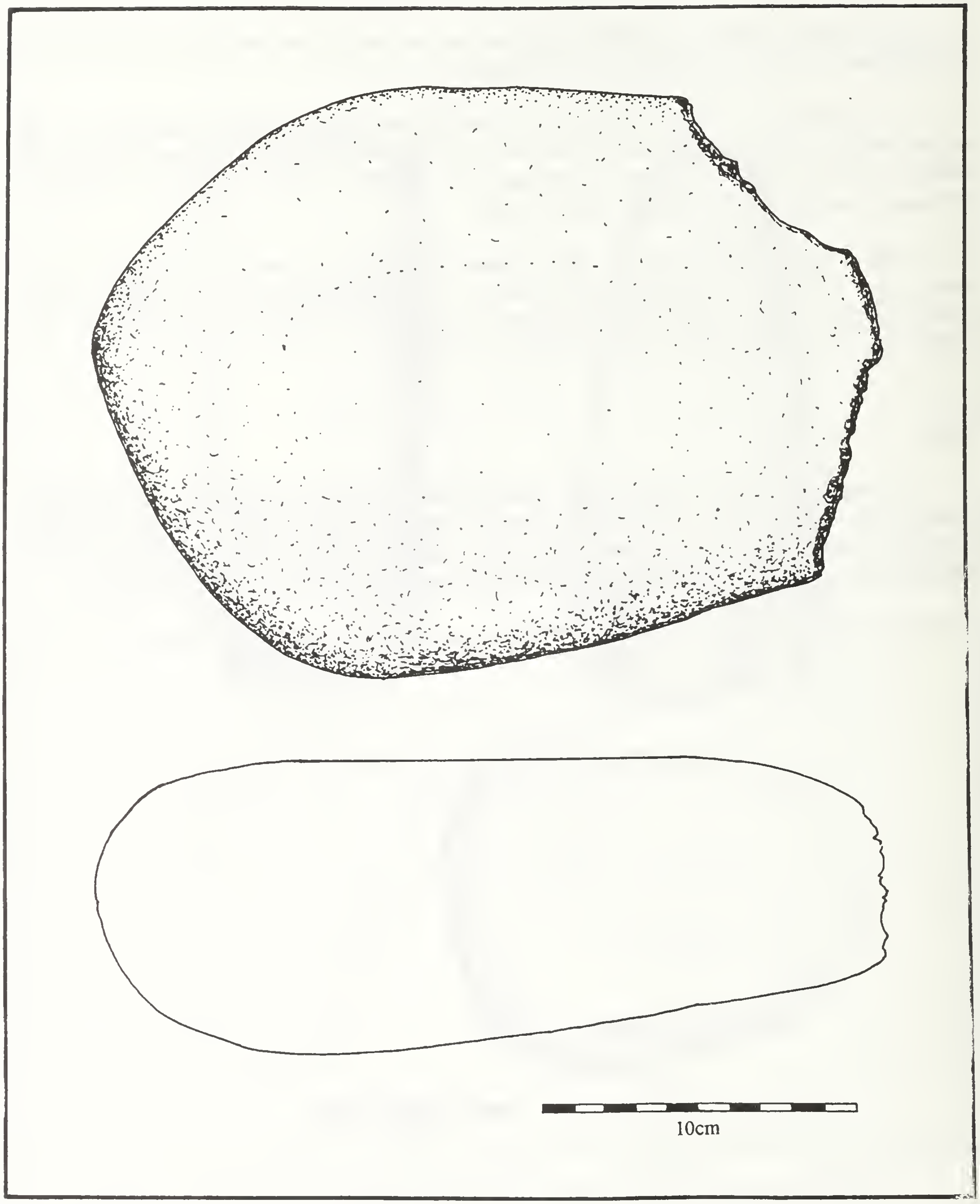


Figure 11. Mortar from CA-TEH-1783; (Cat. #108-92).

Mortars and Metates

One small mortar was collected during the excavation and four more were observed in the field, lined up along the fence on the north side of the site. These latter four were not collected. Two of these exhibit extensive facial polish indicating that they were used as metates as well as mortars.

The collected specimen (Cat. #108-92) is a naturally water-smoothed stone, flattish in cross-section, with one very flattened face on which use as a mortar has worn through the weathered cortex. The worn surface measures 13cm by 9cm (Figure 11). A second, similar stone of andesite (labeled A in Table 13) has a flattened surface measuring 10cm by 8cm, which has been worn through the naturally weathered cortex. A third specimen (B on Table 13), broken on one edge, has a 13cm-diameter indentation about 4mm in depth. These specimens appear to have been used only as hopper mortars, and use wear is on one face only.

Two additional pieces, both larger than those above, exhibit use as both mortars and metates. The largest example (C on Table 13) has a slight mortar indentation on one face measuring 1mm to 2mm deep and 15cm in diameter. Both surfaces show polish indicating use as metates. The other specimen (D on Table 13) has a 16cm-diameter indentation 2mm deep. This surface appears to have been used both as a mortar and a metate.

TABLE 13
PROVENIENCES, DIMENSIONS AND WEIGHTS OF MORTARS
millimeters and kilograms

Cat. #	Provenience/cm	Length	Width	Thickness	Weight
108-92	68N-21W/surface	24.7	18.2	9.1	5.8
A	surface	26	22	10	*
B	surface	-	22	12	*
C	surface	48	36	14	*
D	surface	41	36	15	*

* not weighed

Hammerstones

Two artifacts of andesite exhibit battered areas typical of hammerstones. One of these (Cat. #108-132) is a naturally oval cobble with slight battering at one end (Figure 12, left). The battered area extends for a distance of about 7cm around the end. This artifacts, found in the 50-60cm level of 68N-23W, measures 115mm in length, 80mm in width, 55mm in thickness, and weighs 720.6 grams.

The second specimen (108-250) is much smaller, measuring 68mm by 54mm by 32mm and weighing 158.7g. It exhibits battering on both ends as well as on one face (Figure 12, right).

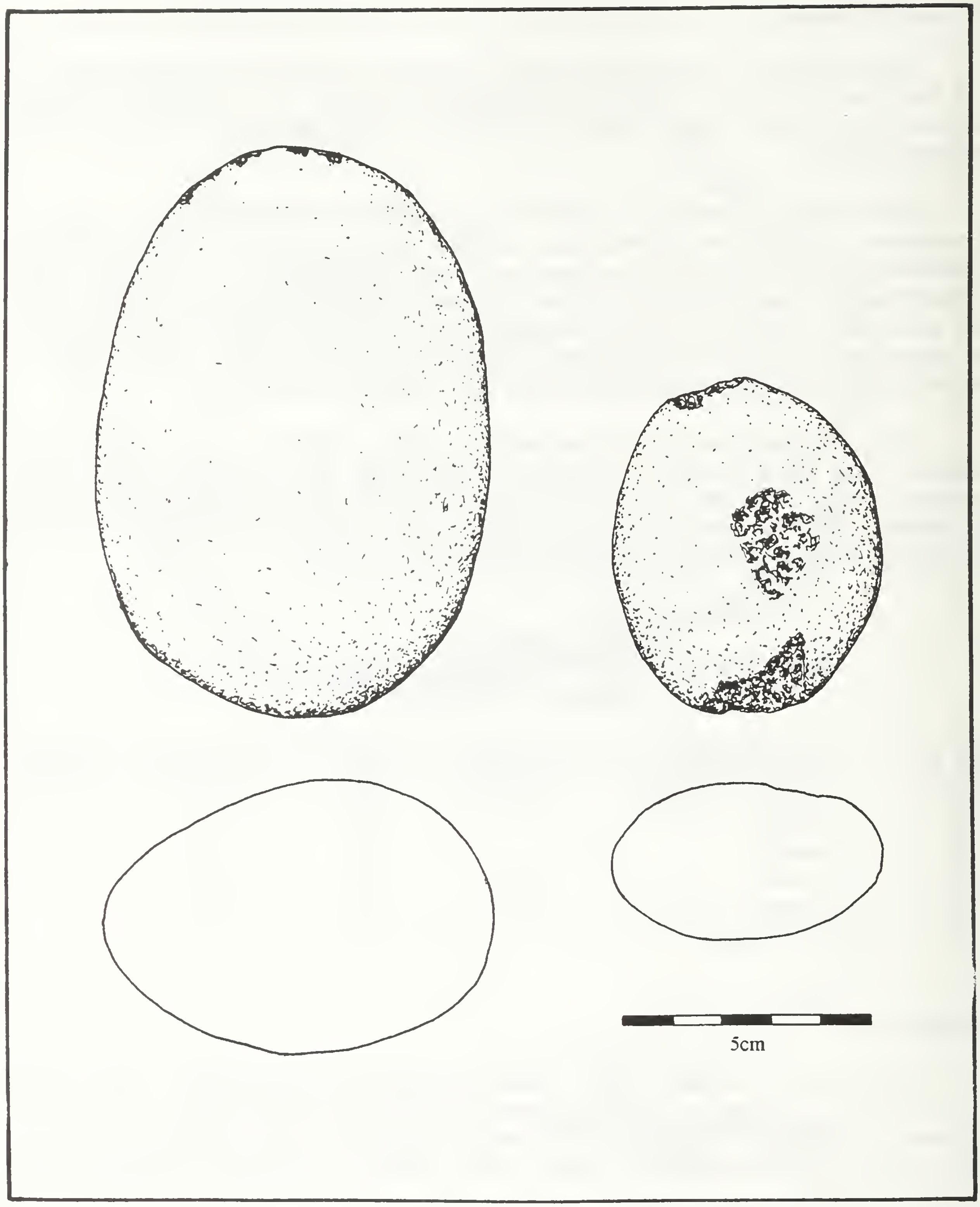


Figure 12. Hammerstones from CA-TEH-1783; (Cat. #108-132 on left and –250, on right).

Scratched Stones

Two small, flat cobbles are distinguished by numerous fine scratches on both faces. The scratches are slightly diagonal to the length of each piece, but are not perfectly parallel to each other (Figure 13). In all cases, the scratches travel from upper left to lower right at roughly a 20 degree angle relative to the length axis. Both have several small edge fractures which appear to be natural and unrelated to the scratches.

The larger of the two (Cat. #108-32), a water-smoothed metavolcanic cobble, was found in the 0-10cm level of 3N-5W. It measures 83mm by 47mm by 11mm in thickness and weighs 71.3g. Scratches extend mainly from one end, covering little more than half of the face (Figure13, left). The opposite face is similar but with fewer scratches.

The second piece (108-27), made on a flat schist cobble, measures 70mm by 51mm by 11mm in thickness and weighs 63.7g. It was found in the 10-20cm level of 4W-4W. One face features a thumb-print sized depression, measuring 34mm by 12mm, which is overlain with scratches (Figure 13, right).

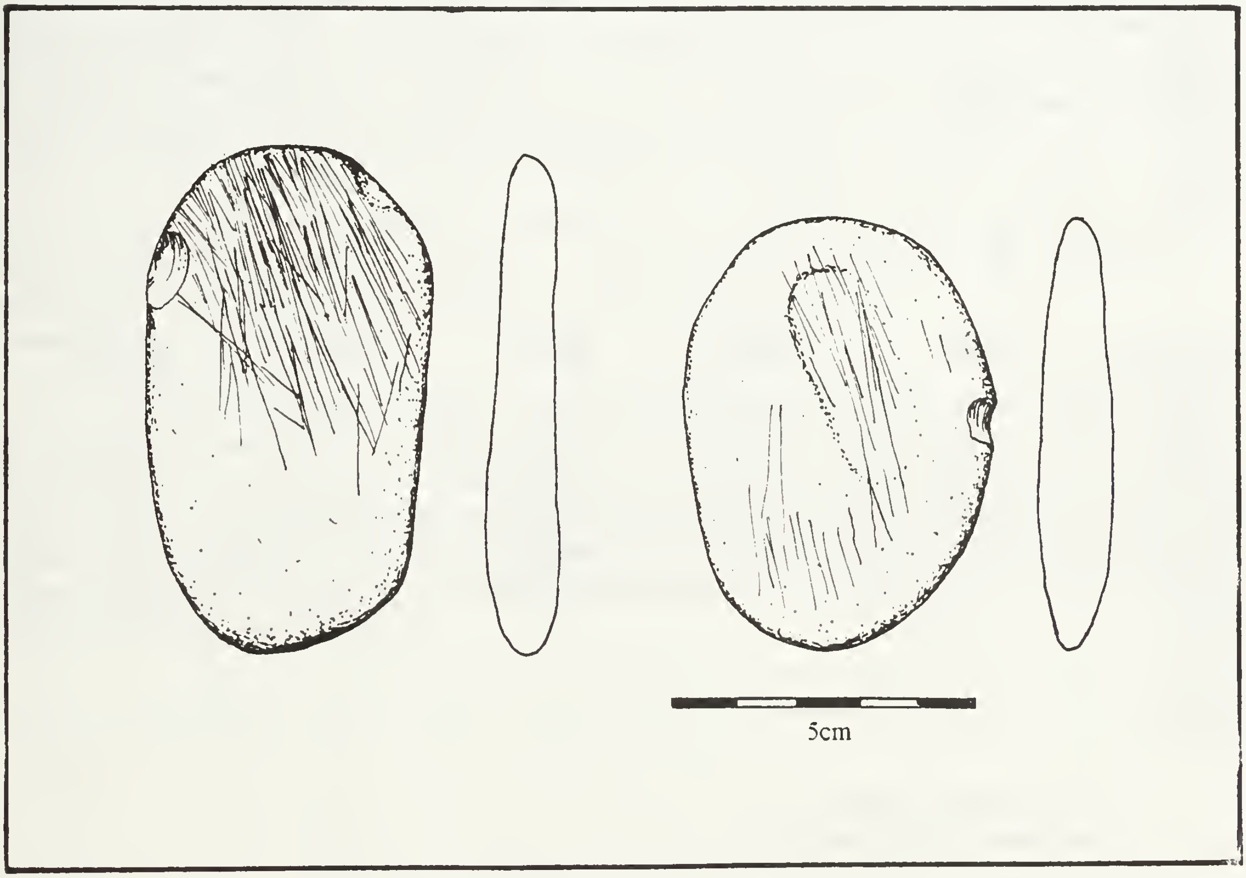


Figure 13. Scratched stone artifacts from CA-TEH-1783; (Cat. #108-32 on left, and –271 on right); note that scratches drawn above are more pronounced that those on actual artifacts.

TABLE 14

DISTRIBUTION OF FAUNAL FRAGMENTS AT CA-TEH-1783 BY NUMBER AND WEIGHT IN GRAMS

DEPTH/cm	0S-20E	2N-1E	3N-5W	10N-9W	10N-19W	68N-21W*
0-10	-	-	-	1 / 0.4	-	-
10-20	-	-	-	-	-	-
20-30		-	5 / 3.3	-	-	3 / 0.4
30-40		1 / 0.3	2 / 0.3	-	-	
40-50		-	2 / 2.6	2 / 1.2	-	
50-60			-		1 / 0.4	

DEPTH/cm	68N-22W*	68N-23W*	70N-14W	0S-0W*	0S-5W	0S-20W
0-10	-	-	-	4 / 2.0	1 / 0.8	-
10-20	-	-	-	1 / 0.1	-	-
20-30	12 / 4.0	1 / 1.1	-	8 / 5.6	1 / 0.1	3 / 0.1
30-40	9 / 13.6	2 / 0.1	-	8 / 4.1	-	-
40-50	2 / 0.1	4 / 0.5	- **	-	5 / 4.5	
50-60	-	1 / 0.1	- **	1 / 0.3	3 / 0.6	

DEPTH/cm	2S-3W	4S-0W	4S-4W	4S-5W	15S-0W
0-10	-	-	-	-	-
10-20	2 / 1.2	-	-	-	-
20-30	2 / 0.3	4 / 1.3	2 / 0.7	2 / 1.1	1 / 0.1
30-40	2 / 1.0	1 / 0.5	2 / 0.2	5 / 1.1	-
40-50	-	1 / 0.1	3 / 0.8	-	1 / 0.1
50-60	-		2 / 1.2	-	-
60-70	1 / 0.1*				
70-80	- *				
80-90	- *				
90-100	- *				

* 1/8-inch mesh screen

** northeast one-quarter only

Faunal Fragments

One hundred fourteen pieces of faunal material were collected during the excavations at CA-TEH-1783. Table 14 provides the distribution through the site by unit and level.

Virtually all are fragments, most of them being slivers too small to identify. A few of the largest fragments can be identified as large mammal, probably deer, and a few as medium to small-sized mammal. Also included are a small number that appear to be naturally occurring rodent bones, unrelated to the cultural deposit.

None is shaped, incised, polished or otherwise modified. Four fragments show evidence of burning.

Fresh-Water Shell

The final cultural constituents collected at the site are shells of fresh-water mussel and two species of aquatic gastropods. The mussel shell, *Margaritinopsis falcata*, is tabulated by weight rather than numbers of fragments since it easily fragments into many more pieces. The distribution by weight is given in Table 15. There are a total of 301 hinges in the collection, representing a minimum number of 151 of these bivalves. These figures calculate to an average ratio of 2.25 grams of shell per hinge or 4.50 grams per bivalve.

Table 16 provides the numbers of snail shells. These are identified as belonging to two species of the genera *Juga* (Chatters 1993). *Juga calibasis okata* is by far the more common, accounting for more than 96% of the total. *Juga oreobasis nigrina*, as is noted on the table, generally occurs in the deeper levels, always below 20cm in depth.

A sample of the more complete specimens of *Margaritinopsis falcata* shell was sent to Jim Chatters for analysis. The sample included 67 shells with hinges from all levels of 2S-3W, 4S-4W, and 4S-5W. Twenty-six specimens of this group were suitable for analysis. Chatters reports that all of the analyzed shell was gathered during the cold months, between November to March. The mean age of the shell is around six years, the youngest group Chatters has run across, which provides evidence of resource suppression due to population densities. Chatters' full report appears as Appendix A.

TABLE 15

DISTRIBUTION OF FRESH-WATER *MARGARITINOPSIS* SHELL AT CA-TEH-1783 BY WEIGHT IN GRAMS PER LEVEL

DEPTH/cm	0S-20E	2N-1E	3N-5W	10N-9W	10N-19W	68N-21W
0-10	-	0.4	7.9	>0.1	-	-
10-20	-	17.3	6.1	>0.1	>0.1	-
20-30		22.9	34.8	-	0.3	0.9
30-40		12.0	7.2	5.4	3.3	
40-50		7.6	4.1	5.8	-	
50-60			11.0		0.4	

DEPTH/cm	68N-22W	68N-23W	70N-14W	0S-0W	0S-5W	0S-20W
0-10	-	-	-	14.6	4.6	-
10-20	-	-	-	15.0	8.1	-
20-30	1.3	-	-	22.0	18.9	-
30-40	-	1.1	-	19.0	16.6	-
40-50	-	-	-*	3.7	10.1	
50-60	-	-	-*	2.2	0.4	

DEPTH/cm	2S-3W	4S-0W	4S-4W	4S-5W	15S-0W
0-10	13.3	18.0	17.4	11.4	7.0
10-20	21.5	13.0	12.6	16.0	2.2
20-30	28.7	21.2	33.4	17.5	10.4
30-40	21.8	14.7	20.1	42.4	9.5
40-50	13.3	9.5	16.3	5.1	9.3
50-60	5.0		2.0	4.5	1.1
60-70	-*				
70-80	0.2*				
80-90	2.3*				
90-100	-*				

* northeast one-quarter only

TABLE 16

DISTRIBUTION OF *JUGA* SHELL AT CA-TEH-1783 BY NUMBER PER LEVEL

J. calibasis okata / J. oreobasis nigrina

DEPTH/cm	0S-20E	2N-1E	3N-5W	10N-9W	10N-19W	68N-21W
0-10	1 / -	1 / -	8 / -	2 / -	- / -	- / -
10-20	- / -	3 / -	5 / -	- / -	- / -	- / -
20-30		12 / -	26 / 3	1 / -	- / -	- / -
30-40		5 / -	14 / -	- / -	- / -	
40-50		8 / -	21 / 2	1 / -	- / -	
50-60					- / -	

DEPTH/cm	68N-22W	68N-23W	70N-14W	0S-0W	0S-5W	0S-20W
0-10	- / -	- / -	- / -	16 / -	4 / -	- / -
10-20	- /-	- / -	- / -	16 / -	4 / -	- / -
20-30	- / -	- / -	- / -	15 / -	18 / 1	- / -
30-40	- / -	- / -	- / -	29 / 1	11 / 2	- / -
40-50	- / -	- / -	- / - *	8 / 1	4 / 1	
50-60	- / -	- / -	- / - *	2 / -	7 / 3	

DEPTH/cm	2S-3W	4S-0W	4S-4W	4S-5W	15S-0W
0-10	11 / -	10 / -	15 / -	5 / -	8 / -
10-20	10 / -	7 / -	19 / -	17 / -	14 / -
20-30	21 / 1	18 / -	15 / -	15 / -	16 / -
30-40	27 / 3	24 / -	15 / 1	22 / 4	11 / -
40-50	14 / -	2 / -	14 / -	4 / -	10 / -
50-60	5 / -		6 / -	3 / -	6 / -
60-70	1 / - *				
70-80	2 / - *				
80-90	4 / - *				
90-100	- / - *				

* northeast one-quarter only

TABLE 17
LATE COMPONENTS FROM JELLY MOUND AND BEND AREA SITES

Site/Area	Radiocarbon Dates	Obsidian Hydration Tuscan	GF/LIW	Assemblage
Jelly Mound				Gunther and corner-notched points, mano, pestles, milling stone/mortar combinations, cobble tools, cores, and flakes of metavolcanic material, net-weights, scratched stones, quantities of mussel shell.
	480 ± 60	0.9-2.1	2.4-3.2	
	550 ± 60	x=1.5	x=2.7	
		sd=0.5	sd=0.2	
Bend Sites*				Gunther Series, DSNs and small notched points, manos, pestles, mortars, milling-stones, large quantities of metavolcanic cores, cobble tools, flakes and flake tools, net weights, mammal bones, particularly rabbit, and mussel shell.
	600 ± 80	1.0-2.5	1.5-2.8	
	680 ± 80	x=1.7	x=2.3	
	700 ± 80	sd=0.4	sd=0.5	
	780 ± 80			
Sentinel Bluff Rockshelter**				Gunther Series and small notched projectile points, manos, hopper slabs, small cobble tools, petroglyphs, and mussel shells.
		0.8-2.3	2.2-3.0	
	700 BP to 150	x=1.5	x=2.7	
		sd=0.5	sd=0.4	

* Sundahl 1993
** White, personal communication

x = mean value
sd = standard deviation

Conclusions

During the Spring 2000 excavations at Jelly Mound nine cubic meters of soil from 17 1m square units were examined, producing an assemblage consisting of 60 artifacts, 1110 pieces of flaking debris, 114 faunal fragments, and more than 1000 pieces of fresh-water shell. In addition, three fire hearths were featured.

All artifacts are made of stone, with artifacts and debitage of metavolcanic materials outnumbering those of obsidian by nearly three to one with the use of ¼" mesh screens. The artifact assemblage contained eight projectile points and point fragments, 14 other flake artifacts, 25 cores and cobble tools, four net-weights, eight grinding stones, two hammer stones, and two scratched stone artifacts.

Radiocarbon assays dated two of the hearth features at about 500 years in age, and all but one of 30 obsidian hydration measurements are consistent with a late temporal assignment within the past 1000 years. These data strongly indicate that the cultural deposit is a single component, and all artifacts, shell and bone represent a single settlement/subsistence pattern.

Comparing these data to that from other studies in the area, most elements from Jelly Mound match those in the highest stratum at the Sentinal Rockshelter, dated within the past 700 years, and at the Bend sites which have four radiocarbon dates between 800 and 600 years ago. Lacking from Jelly Mound, however, is the larger amount of mammal bone, particularly rabbit, found at Bend. Projectile points from Jelly Mound include two Gunther Series points assignable to this late time period, and two medium-sized corner-notched points which often are considered older. The Jelly Mound specimens were not measured for hydration band, but at the Bend sites, four of six hydration values on corner-notched points were identical to those on the three Gunther points; the other two corner-notched points had considerably larger values. These data are summarized in Table 17.

No house features were found at Jelly Mound. The assemblage, rather than representing a wide range of activities found at typical village sites, is weighted toward specific tasks. Projectile points, which often far outnumber grinding stones at sites, are nearly matched in number by manos, pestles and millingstones at CA-TEH-1783. And *Margaritinopsis* and *Juga* shells outnumber and outweigh mammal bone fragments, with a total weight of 56.4 grams, by a factor of more than ten. These ratios provide an indication of the importance of different activities at the site. All of the shell examined by Jim Chatters was collected during the cold months, between November and March. These elements and percentages suggest a winter encampment specifically aimed at harvesting resources of the Sacramento River.

Although no direct evidence of fish exploitation was found, this is often the case in river sites. If fish were dried whole and transported to the winter village for storage, or dried fish was pounded into flour, there would be little physical evidence remaining at the site. Yana ethnographic notes indicate that fish bone, especially spring salmon, was eaten and seldom discarded. Indirect evidence is present in the form of net weights, and possibly the scratched stone artifacts which may be fishing charms (e.g., DuBois 1935:82).

The exact use of the cobble tools and modified and unmodified metavolcanic flakes is not known, but similar large quantities are found at other river sites and they may have been associated with the processing of fish or other river resources. Conversely, the paucity of projectile points and obsidian debitage reflects a very limited occupation with hunting. Possibly this portion of the assemblage represents the repair of broken tools, and no hunting activities originated at the site.

The grinding stones may have functioned in day-to-day food preparation for the group while they camped at the site, or may have served in the processing of fish or other foodstuffs as they were being collected for storage. Protein residue analyses have sometimes been successful in identifying the uses of millingstones, but this technique was not tried with the Jelly Mound artifacts. This, however, is one possible avenue of learning more about the function of the site and the economic activities that tool place there.

Knowledge of the cultural identity of the Jelly Mound inhabitants is necessary to test models of ethnic boundaries and their changes through time, and differing settlement patterns among different ethnic groups. The artifact assemblage at Jelly Mound more closely resembles a typical Yana assemblage rather than one from the Wintu or Nomlaki areas as manos, millingstones, notched points other than Desert Side-notched points, and net-weights are found in the former but very rarely are associated with the latter two. It will be assumed, then, that the cultural deposit at Jelly Mound resulted from multiple visits to the site by members of an ancestral Yana group.

One anomaly is the scratched stones. These are reminiscent of somewhat similar stones, common in Redding-area Shasta Complex sites, which are interpreted as fishing charms (e.g., DuBois 1935:82). Although the Redding specimens are generally longer and more cylindrical in shape, they share with the Jelly Mound artifacts the scratching patterns and, in one case at Jelly Mound, a thumb print-sized indentation. A list of cultural traits among the Northern and Central Yana specifically states a lack of charmstones among both groups (Gifford and Klimek 1939:81). It seems possible, however, that this trait may have been adopted from the Wintu. None of these charms have been reported for Nomlaki sites (e.g., Treganza 1954).

In a proposed subsistence strategy for the Yana, Wiant (1981:126-127) concludes that salmon, the primary protein source, were collected and dried for storage on an annual basis, gathered primarily during October and November. September was the primary time for collecting acorns, an activity centered close to the foothill villages, and later in the fall, people moved to the river for fishing activities. This hypothesized subsistence pattern fits well with the archaeological evidence from Jelly Mound.

Sapir and Spier (1943:252) report that the Yana obtained fish either by spearing, by fishing with hook and line, or by means of seine nets. The chief fish was salmon, which was cut open along the backbone, cooked, roasted over a fire or baked on heated rocks. Dried salmon were preserved in open work storage baskets lined with leaves of the broad leaf maple. They also report that the Yana claimed regular fishing places on the Sacramento River with one near the present location of Balls Ferry and another at the mouth of Battle Creek (Sapir and Spier 1943:246), but a short distance north of Jelly Mound.

It was the purpose of this test to determine whether CA-TEH-1783 at Jelly Mound contains data that can yield information important in prehistory. The introduction of this report reviewed several archaeological projects conducted in the area with respect to research themes. Data from Jelly Mound is applied to these themes below in an effort to determine its potential for yielding additional significant knowledge.

The Pre-Wintu/Post-Wintu model hypothesized by Hamusek and Kowta (1991) proposed that the Wintu replaced the Yana on the east side of the Sacramento River around AD 500. Data from Jelly Mound, as well as at Bend, indicate that the Yana still held the eastern bank of the Sacramento as late as 500 BP (AD 1450). There is little, if any, evidence that the Wintu occupied the Jelly Mound site. This agrees well with ethnographic boundaries mapped by Sapir and Spier (1943, Map 1), although several other ethnographers claim it for the Nomlaki or Wintu (e.g., Kroeber 1976:351; Merriam 1966, Map 5; Powers 1976:230; Waterman 1918:40).

The presence of feature-related charcoal suitable for radiocarbon assays is documented for the site and obsidian is present in sufficient quantities for hydration analyses, should further investigation be warranted. It appears that Jelly Mound can contribute to studies in areal cultural chronology in a limited way, by providing information on a brief horizon dating around 500 years ago. There does not appear to be any stratigraphy at the site, although this may be due in part to years of plowing. The hearth features are intact at depths of 30cm and below, and presumably stratigraphic change would be evident if any exists. Since the cultural deposit appears to belong predominantly, if not exclusively, to a single, relatively brief component, all cultural elements fit together as a whole.

The site has already contributed information on settlement and subsistence patterns dating primarily to its brief period of occupation. The analysis of fresh-water mussel shell indicates that the site was occupied during the winter months of November to March. The abundance of shell and paucity of bone fragments suggest a focus on riverine resources rather than land-based mammals. The minimal occurrence and fragmented character of faunal remains indicates that, until more advanced means of faunal identification are available (DNA studies?), the study of these remains would probably not further the knowledge of economic activities at the site. Fire hearths were encountered in six of the 17 excavated units, and it is likely that additional such features are present at the site. These may be related to the preparation of salmon or other river resources. Protein reside studies on soil samples or fire-affected rock, as well as on milling stones, may contribute further to the inquiry of economic activities practiced at the site. Additional knowledge may be gained through flotation separation and identification of seeds from the midden matrix.

The potential for studies of lithic procurement strategies seem somewhat limited at Jelly Mound. The overwhelmingly predominant lithic material is in the form of metavolcanic cobbles, which were probably gathered from gravel bars along the nearby river or from the alluvial strata. These are expedient flakes, cobble tools and cores used and discarded at the site. The occurrence of obsidian is rather minimal at the site and does not indicate a strong preoccupation of obsidian knapping. The majority of obsidian comes from the Tuscan source, which has several exposures in the Tuscan formation along the east side of the upper Sacramento Valley. Hamusek (1993) has developed techniques for distinguishing among some of these exposures including one at nearby Paynes Creek, which could contribute further to understanding lithic strategies. Obsidian from the Grasshopper Flat/Lost Iron Well source, most of the Tuscan obsidian, and possibly obsidian from one or more additional sources was probably acquired through trade rather than direct collecting expeditions.

The limited testing at Jelly Mound did not reveal inter-site differences in site structure. Fire hearths were found both on the northern and southern sides of the site. Except that the cultural deposit is much thinner on the northern side, the distribution of cultural materials in type and function appears relatively uniform across the cultural deposit.

These are the results of the archaeological testing at CA-TEH-1783 at Jelly Mound. BLM may consider these results in their effort to determine whether the site has the potential to contribute significant additional information to the prehistory of northern California.

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APPENDIX A

IDENTIFICATION AND SEASONALITY OF MUSSEL SHELL FROM SITE CA-TEH-1783, TEHAMA COUNTY, CALIFORNIA

by
James C. Chatters, Ph.D.

IDENTIFICATION AND SEASONALITY OF MUSSEL SHELL FROM SITE CA-TEH-1783, TEHAMA COUNTY, CALIFORNIA

James C. Chatters, Ph.D.(1)

Introduction

Shasta College submitted samples of freshwater mussel shell from site CA-SHA-1783, a Late Period site (14C ages of 550±60 and 480±60 BP) located along the Sacramento River in Northern California. The samples came from excavation units (2S-3W, 4S-4W, and 4S-5W) and, though small, were in excellent condition. All specimens are from the species *Margaritinopsis falcata*(Gould) (formerly named *Margaritifera falcata*). I measured growth increments on the 26 specimens that were complete enough for study. Of these, 22 were suitable for season-at-death assessment and 25 for age determination. I treat the collection as a single analytical unit in this presentation.

Seasonality

Analyses of season-at-death are based on observations of growth increments in the resilial tuberosity or ligament attachment, located on the hinge of the shell. I have described the technique for preparing specimens and making these observations in detail elsewhere (Chatters 1987, 1999). Growth increments were measured using a Unislide® movable stage made by VELMEX of East Bloomfield, New York, a Mini-scale® magnetic encoder made by ACU-RITE of Jamestown, New York, and a Meiji® variable focus microscope at magnifications ranging from 7x to 45x. The measuring equipment has a calibrated precision of 1.2 μm; measurements were made to .01 mm.

I measured all distinguishable growth increments on each specimen, then calculated the percentage new growth that the last growth increment represents of a base value (expected full growth for the year). In this case the base value was the penultimate growth increment. Growth indices could be determined for 22 of the specimens in the sample; the remainder lacked the terminal growth increments. I determined season-at-death for the assemblage by comparison with control series of *Margaritifera falcata* from Washington, Oregon, Idaho, and California (Chatters 1999).

I used two approaches to assess seasonality, the mean index and graphic methods. The mean index method calculates the mean and standard deviation of growth indices for each sample and compares it with the growth curve from the control collections. The graphic method creates a graph of growth indices, grouped in units of ten, and compares this graph with those from control collections taken during various months of the year.

Mean indices indicate a single season of mussel collection for the collection as a whole, which has a mean of 100±16.5. This value matches the control curve for November. The graphic method provides the same result (Figure 1). When the curve for CA-TEH-1783 is compared with curves for control collections of *Margaritifera*. It matches those from November and March, which indicates mussel exploitation during the cold months of the year.

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(1) Applied Paleoscience, 648 Saint St., Richland, Washington 99352.

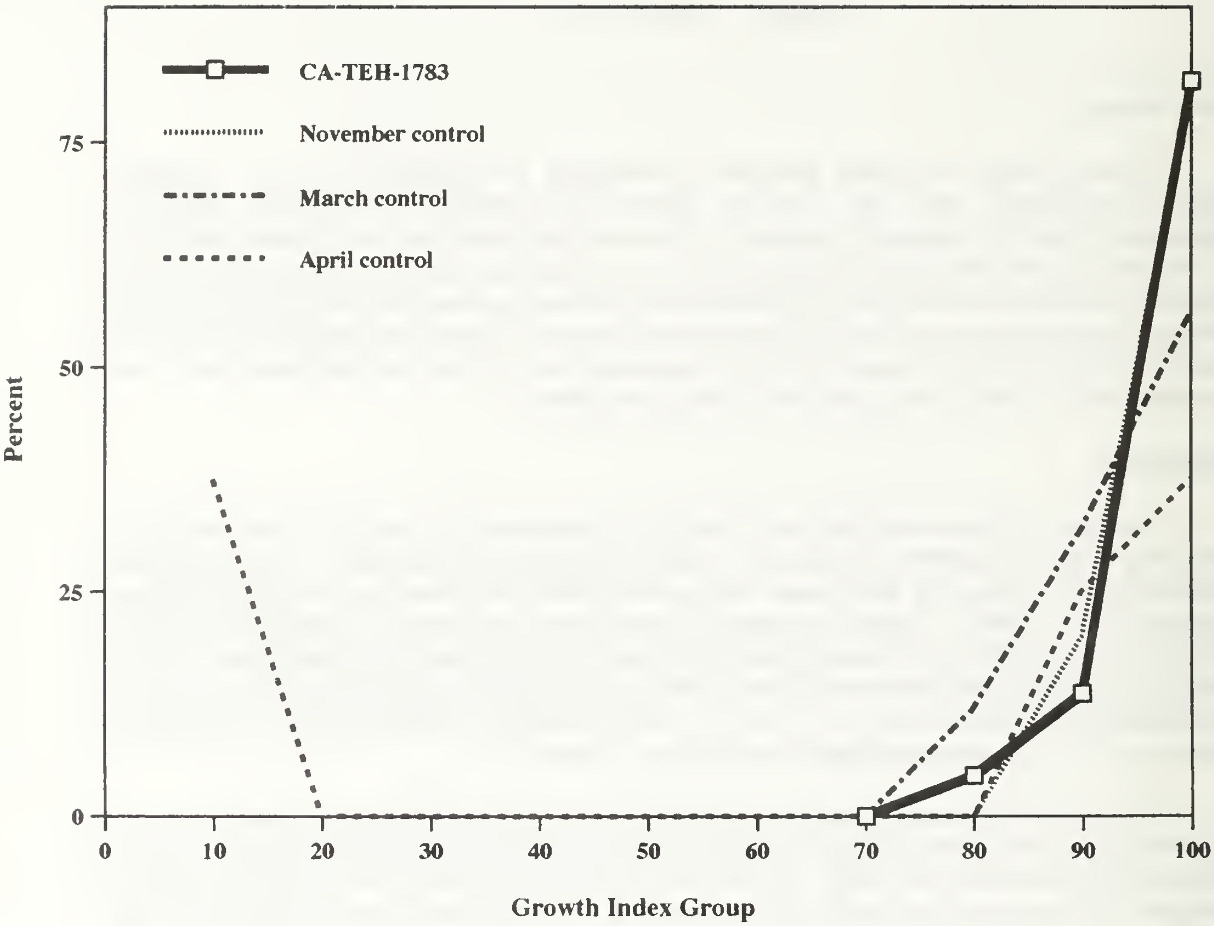

Figure 1. Growth indices for CA-TEH-1783 shells compared with growh index profiles for three modern control groups of *Margaritinopsis falcata*.

Age Structure

Age–at-death is estimated by counting the number of annual growth increments and adding to that value the number of years necessary to account for missing growth increments near the proximal end of the resilial tuberosity (the umbo). I estimated the number of years necessary to account for missing growth increments by taking growth increment measurements for the single individual that exhibited all increments to the umbo, using the measurement for its first growth year to identify individuals with the next most complete resilial tuberosities, then averaged the second year's growth for all individuals missing one or no years' growth. I then used this value to identify individuals that were missing only two years' growth and add them into the analysis to determine mean growth for the third year, and so on until all individuals were accounted for and their ages estimated.

Specimens in this collection are consistently very young, with an age range of only 4 to 9 years. Mean age is 6.08±1.32, with a mode of 5 years and a median of 6 years.

Discussion

During the Late Period, human inhabitants of the northern Sacramento River basin preyed heavily on populations of *Margaritinopsis falcata*, indicating that human populations in the area were themselves very dense (Chatters and Cleland 1997). In samples from the Pit River that dated between ca 300 and 700 B.P., mean ages ranged from 7.8 to 10.1 years (Chatters 1997). On the Sacramento proper, mussel samples from the last 1000 years of prehistory range from 9.5 years at CA-BUT-12 (Eugster 1990) to as young as 6.5 years at CA-SHA-222 (Chatters 1990b) and CA-TEH-1523 (Chatters 1993). The present sample is the youngest assemblage of *Margaritinopsis falcata* I have yet worked with.

Conclusions

I analyzed all shell material from CA-TEH-1783 to determine the seasonality and age structure of the collection. Mussel harvest appears to have occurred in the cold months, sometime from November through March. Specimens are consistently very young, indicating heavy predation on this low-ranked species and, by extension, a dense, resource-stressed human population.

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